Higher Education as Choice of Individuals:

An Empirical Analysis of Individuals' Behavior of Educational Decision-Making in South Korea

Master's Thesis

June 2018

SEEKYUNG CHUNG

Master's Degree Programme in Public Choice
Faculty of Social Science
University of Tampere

ABSTRACT

This paper casts light on the individuals' decision-making behavior concerning higher education by exploring determinants of educational choice and actual returns to education in the context of South Korea. Given that South Korea has undergone a massive expansion of higher education since the 1980s and hitherto shown a highest share of the highly educated young population among the OECD nations. In this respect, it has been of keen interest to investigate the behavior of individuals regarding what expected value of higher education are among them and what factors drive them to pursue higher education.

The underlying assumptions of the individuals' rationality framework imply that individuals are utility maximizers by making choices which yield the best outcome within given resources. Following this line of thinking, educational choice indeed lies in the individuals' decision-making process for utility maximization. From the perspective of economics, education refers to a means of investment in human capital, which improves productivity and earnings in turn. Furthermore, sociological rationality models have endeavored to find out the extent to which the individual and socioeconomic factors affect the decision-making on education among individuals with particular interest in inequality of education in society.

Hypotheses are constructed on a basis of theoretical framework to test by a means of empirical analyses. As for data, the 'Korean Education and Employment Panel (KEEP)' of the 'Korean research institute of vocational education and training (KRIVET)' has been employed. The empirical analyses include two analytical approaches. The first analysis is binomial logistic models to estimate the effects of the individual and socioeconomic levels of factors on the decision-making of higher education. In the second analysis, the actual monetary and non-monetary returns to education have been examined.

According to the results of final logistic estimations, 'academic ability' and 'type of high school' are indicated as the significant factors on the individual and school level in the decision-making of higher education. Concerning the social background, 'father's education level' and 'family's expected education level of child' are also shown as significant factors, which are in line with the empirical models of sociological rationality. Nevertheless, there has been a noticeable determinant, which is distinctively comparable to the models of sociological rational choice. It is an economic factor 'household income', which appears to be very significant predictor after all showing that individuals tend to pursue higher education irrespective of the economic status. This partly allows us to account for the phenomenon of the explosive proliferation of higher education in South Korea. Finally, the results of the second analysis indicate that monetary and non-monetary returns, more specifically, earnings and job satisfaction have positively correlated with the level of education. In this vein, the expected value of higher education appears to be higher than those of lower levels of education. Nevertheless, females seem to have less strong educational effects in the labor market compared to males.

Key words: expansion of higher education, rational choice, human capital, expected value, returns to education, binomial logistic model, South Korea

Acknowledgements

I am so grateful that I have had an incredible opportunity to challenge myself in the Public Choice programme, faculty of social science, Tampere university. The two years have gone so fast thanks to amazing teachers and fabulous colleagues. It is all thanks to Prof. Katri Sieberg. I also sincerely appreciate Prof. Pertti Koistinen and Fullbright scholar Peter Miller for inspiration and encouragement. To my family that has always looked forward to having more time with me as a wife and a mother, I thank you all, my husband Dongseob, my beloved children, Jeehwan, Jeehyung and Jeesung. Lastly, I dedicate my master's thesis to my adorable mother, Eunsim, who has always trusted in me and supported me with her everlasting love.

Table of contents

List of figures and tables

1. Introduction

The expansion of higher education has been observed in many parts of the world, particularly throughout 20th century and thus far. Since the first publication of "Overeducated Americans" (Freeman, 1976) warning about what overeducation would bring to the society, there have been numerous endeavors to account for this phenomenon, particularly, in the disciplines of sociology (e.g. Meyer et al., 2007; Schofer et al., 2012). Yet, there have been rare investigations to account for the phenomenon of the higher education expansion in the discipline of micro-economics.

In this regard, this study attempts to elaborate the phenomenon of the expansion of higher education through the lenses of economics and sociology of education based on rationality framework. This paper is thus primarily constructed on the ground of rational choice theory and human capital theory from the perspective of micro-economics and sociological rational choice models in terms of educational decision-making. According to theories and models stemmed from the framework on rationality, a utility-maximizing individual makes rational choices, which would yield the highest expected utility between alternative choices. In light of educational choice, it is analogously described that a utility-maximizing individual makes decisions on human capital investment based on implicit calculations of benefits and costs given resources. In respect to higher education, if the expected return of higher education is larger than the expected return without higher education, an individual chooses going to college or university rather than, for example, participating in the labor market.

With the underlying assumptions stemmed from rationality literature, an empirical study of the individuals' decision-making on higher education is anticipated to investigate a variety of factors affecting the choice of higher education and to account for the expansion of higher education as the accumulation of individuals' choice. Accordingly, the following research questions are focused to answer throughout the paper.

- What factors are associated with individuals' decision-making of higher education?
- Which aspects comprise the expected value of choice of higher education?
- How the phenomenon of expansion of higher education can be explained by rationality?

Having taken these questions into account, this study aims to explore the higher education decision-making behavior of individuals in the context of South Korea. South Korea is chosen as the case

country for the empirical analyses for several reasons. It has been widely recognized that there has been dramatic expansion of higher education during the past three decades in South Korea along with rapid industrialization and modernization. In the late 20th century as we as in the beginning of the 21st century, South Korea has been a country with biggest shares of the highly educated especially among the younger generations in the world[1]. Consequently, the nation has been experiencing rapid transition from the society of requiring increase of educated workforce to the society of having excess of overeducated workforce owing to proliferation of higher education. More importantly, there have been empirical evidences showing that effects of higher education on the labor market have been decreasing over time (e.g. Kreidl, Ganzeboom & Treiman, 2004; Sandefur & Park, 2007; Jung & Lee, 2016). In a similar vein, the massive supply of the highly educated may lower the effects of educational credential due to "credential inflation" (Collins, 1979). By paying particular attention to these current circumstances, it seems that South Korea appears to be a good case for observing expected value and effects of higher education and thus individuals' educational choice behavior.

For the empirical analysis, the 'Korean Education and Employment Panel (KEEP)[2]' is utilized. The KEEP was designed for developing effective educational policies as well as in-depth research by examining educational environments, educational effects, school to work transition and many others by means of longitudinal surveys since 2004. This nationwide panel survey database currently offers datasets for 12 years from the year of 2004 (wave 1) to the year of 2015 (wave 12) of 8,257 observations. The KEEP database provides essential information in relation to education and employment, and it is particularly good sources for the exploration of the behavior of educational choice as well as educational, occupational and socioeconomic status of the individuals.

Based on the framework of rationality in the disciplines of economics and sociology of education, the hypotheses are constructed. In order to test the hypotheses, two analytical approaches are applied in the paper. First, binomial logistic models are established to estimate the impacts of individual and socioeconomic factors on the probabilities of a pursuit of higher education. The results show that scholastic ability and family background such as father's education level, family's expected level of education of child and household income appear to be statistically significant. Household income is

[1] According to OECD (2017), South Korea has been ranked the top which has have the highest share, about 70% of the highly educated in the 25-34 aged population, followed by Japan and Canada having shares of near 60% of the highly educated in 25-34 aged population.

[2] For further information regarding the KEEP, see http://www.krivet.re.kr/eng/eu/eg/euCAADs.jsp

particularly shown as the most crucial determinant in explanation of the massive proliferation of higher education in South Korea. In the latter part of analysis, the actual returns to education are explored. Occupational, monetary and non-monetary returns to education appear to be positively correlated with level of education, which confirms human capital theory and rational choice theory. Notwithstanding, gender inequality with respect to returns to education seems to be persistent, which is consistent with other empirical studies on South Korea.

In the following section of theoretical framework, salient economic theories in terms of rationality and human capital are explored and the sociological rational choice models of educational decision-making are further examined. In the third section, education system and behavior of educational choice in South Korea are introduced. Subsequently, hypotheses are presented in the fourth section. Furthermore, applied empirical model is described in detail in the fifth section. Research methods, data and variables are further described in the sixth section. In what follows, the results and findings obtained from the empirical analyses are illustrated in the seventh section. The conclusion, in the final section, embraces discussions, limitations of research and more importantly, policy implications.

2. Theoretical framework of educational choice

2.1Rational choice theory

The rationality is the well-known notion which has been using for understanding and explaining of the behavior of individuals in the disciplines of economics, sociology and psychology. Rabin (1998), for example, describes individuals' rational behavior as follows:

> "Economics has conventionally assumed that each individual has stable and coherent preferences, and that she maximizes those preferences. Given a set of options and probabilistic beliefs, a person is assumed to maximize the expected value of a utility function… (Rabin, 1998, p.11)"

In other words, rational individuals make decisions based on the list of preferences which are listed according to intrinsic calculation of expected values. And those expected values of each option are estimated based on experiences, knowledge and information. It is also pointed out by

DesJardins and Toutkoushian (2005) that individual's rationality can be defined by preferences and perception toward risk.

The crucial characteristics of a rational individual is that she or he intends to maximize their satisfaction or happiness by making the best choice. When it comes to the educational decision-making, the same logic can be applied by rational choice theory. It is very much acknowledged not only in economics but also in sociology and education that individuals simultaneously face moments of educational choices between alternatives and they ultimately choose the options which will maximize their satisfaction or happiness (e.g. Jæger, 2007; Paulsen & Smart, 2001). Therefore, theory of rational choice provides the central assumption that a decision made by the individuals is fundamentally based on rationality of the individuals. This rationality framework can further explain intrinsic calculation of expected benefits and costs as the solution to optimization problem. In other words, the individuals have a decision-making process of calculating potential benefits and costs in order to make the optimal choice out of the alternative options. In this regard, educational decision-making can be also elaborated on basis of the rational behavior of individuals. Paulsen and Smart (2001) describe that the individuals make a variety of educational choices ranging from an access decision on whether to pursue higher education, to a decision on institutional choice and field of study, to a persistence decision on re-enroll of higher education and more.

With the underlying assumptions of rationality, the educational choice behavior can be further examined by a means of microeconomics. It begins with theory of consumer behavior describing consumers' consumption choices of goods and services. The behavior of consumer can be applied to a mechanism of educational choice. It is integral to draw an analogy of the individuals' behavior, particularly students, from the behavior of consumers. According to DesJardins and Toutkoushian (2005), a study of consumption behavior assumes that individuals intend to maximize satisfaction or happiness, in other word, welfare. In this line of thinking, choice of education can be also understood as the decision-making from the view point of consumption behavior. This stance is supported by Freeman (1976) who perceived the behavior of students and their parents as the investors and consumers of education.

In economic terms, it is tricky to define education as either pure public goods or merit goods, or private goods in general. Education per se varies from preschool education to primary, secondary, upper secondary, postsecondary and higher education and from vocational education to life-long education and so many others. Nevertheless, in most cases, primary and secondary educations are provided publicly and partly privately as the basic compulsory education. Those compulsory educations can be regarded as either public goods or merit goods. As public goods, compulsory education is open to every child and as merit goods, compulsory education brings positive externalities to the society by fostering good citizens and thus better society.

However, in case of higher education, it has different characteristics distinguished from the compulsory education. Higher education is excludable and rivalrous, more precisely, study places are offered for a fixed number of students, thus competition consequently arises to get in the higher education institutions. Prestigious schools particularly feature fierce competitions among applicants to get admitted from those schools. In this respect, higher education is indeed private goods. With respect to costs, higher education is far costlier compared to other types of education. In case of the private institutions, it is known that tuition fees of private colleges and universities are usually far more than those of public institutions. Although there are very a few nations, such as Finland and Germany, providing higher education free of charge[3], however, it is acceptable that higher education is high-priced in many other parts of the world.

Assuming that higher education is private goods for the consumers, it is necessary to extend our interest from the behavior of consumers to the behavior of consumers of education service. In practice, it is inevitable for a rational consumer to reckon potential costs and benefits before making decisions on consumption. If we borrow from the economic terms, the consumer of education makes educational choice from which she/he can maximize her/his utility. Such that, utility of consumer is referred to as the amount of satisfaction, happiness or welfare arising from the consumption activity with the bundle of combined goods and services.

[3] For example, in Finland, institutions of higher educations are mostly public, and all levels of higher education are provided free of charge. Though non-EU students have been subject to pay for tuition fees for undergraduate and graduate studies since 2017.

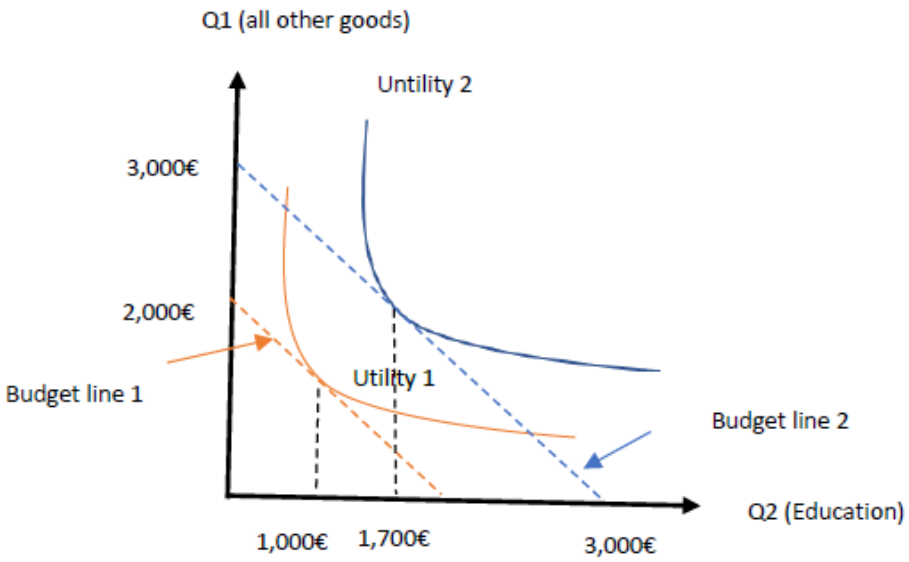
According to Dougherty and Psacharopoulos (1977), the individuals concern about the optimality of resource allocation within education as well as between education and other goods and services. It is true that education is not always prioritized among all consumption goods and services. Nevertheless, if expected value of higher education is higher than any other consumption, it is the case of the individuals for whom higher education is of most interest. In this respect, the consumers of education, especially students and parents, appear to be decision-makers who make choice of the optimal consumption bundle of education and all the other goods through the mechanism of the rational behavior of consumption (DesJardins & Toutkoushian, 2005).

As stated before, the approach of consumer theory to the behavior of educational decision-making allows us to look at the individual educational decision-maker as the consumer who decides consumption of education as private goods. In addition to that, theory of expected utility can be applied for a further understanding of the behavior of educational choice. It follows that the individuals have subjective estimates of the utility that they would obtain from consumption of different goods and services. Moreover, the individuals conceive different levels of expected utility from the consumption, which is graphically described with indifference curves in Figure 1. Indifference curves are basically downward sloped since marginal utility decreases with the consumption of one extra unit. Thereby, indifference curves of each person are downward shaped but with different levels of utility. Along the line of each indifference curve, each point represents the same level of utility. More distant curves from the center imply higher expected utility which individuals always look forward to having. Accordingly, utility 2 refers to a higher utility than utility 1 in the following figure 1.

Although it is anticipated to have higher utility from a choice of the best choice as nature of human-being, it is almost impossible to have ultimately high utility especially through the consumption activity. From the economic perspectives, it is due to the scarcity of resources. Individuals always have limited amount of resources which allow each of them to consume within given amount. In economic terms, it is referred to the budget constraint. Budget constraint is a very crucial concept which is to confine the range of choices available for the individuals. In terms of economic aspects, the individual's budget is conventionally indicated by earnings. However, as for choice of education, budget can be indicated by not only financial resources but

also other resources such as scholastic ability, time for education, socioeconomic background and more.

Figure 1. Indifference curves and budget lines (Desjardins and Toutkoushian, 2005)



The amount of budget constraint varies across individuals and it can be also changed. For instance, when income is increased while other things remain the same, the individual has a bigger amount of budget than before. As seen in figure 1, when income grows, the budget line shifts upwards from budget line 1 to budget line 2, thus the individual has a bigger area of budget. The change of price of consumption goods can also affect the budget line. For example, when the unit price of education service rises while other prices remain the same, it would change the ratio of budget line. The budget line thus will become steeper.

When indifference curve and budget line are assembled in a graph, it is even more graphically visible to solve out the optimality problem. The point where the utility function curve adjoins the budget line is the solution to the optimality problem. The equilibrium which is another name of the optimal point is referred to the optimal choice which maximizes individual's utility subject to budget constraint. This is the essence of rational choice theory which pinpoints the assumption that a rational individual makes the best decision which yields the highest level of utility given

own resources (DesJardins & Toutkoushian, 2005). It is described in the graph as the examples[4] that for a person with a smaller budget of 2,000€ (budget line 1), her/his optimal choice is the consumption bundle of 1,000€ for education and 1,000€ for all other goods. However, for a person with a bigger budget of 3,000€ (budget line 2), the allocation of budget will be different. The optimal choice given the budget and utility function is the consumption bundle of 1,700€ for education and 1,300€ for all other goods as an equilibrium.

Individuals' perception of risk is another integral concept which should be conceived in the conceptual framework of rational choice. The individuals' decision-making behavior could vary depending on their risk preference. On one hand, some individuals tend to take risk by making a choice which yields the highest expected utility albeit with a low level of certainty. On the other hand, others are likely to avoid risk by taking the safest option with a high level of certainty. Likewise, in relation to the individuals' educational choice, students and parents would reckon optimal choices depending on own level of preference of risk (Desjardins & Toutkoushian, 2005).

Let us assume, for example, that there are two higher education options for a high school student: on the on hand, there is an option of a prestige school with very low likelihood of admittance and expensive tuition fees, however very high utility including high social network and status and future earnings are expected after graduation. On the other hand, there is the option of a relatively less prestige school with very high likelihood of admittance and less expensive tuition fees despite lower expected utility after graduation. In effect, there must be many other determinants influencing the behavior of decision-making. In addition, making a choice becomes more complex if the individuals have different weights on those determinants. Notwithstanding, if only risk-preference is taken into account, a risk-loving individual would take a risk by applying to the prestige college, whereas a risk-averse individual would decide a less risky option by applying to the less prestige college with a high likelihood of admittance. A risk-neutral individual, otherwise, would reckon probability of admittance and expected utility in order to find out the option which will generate the highest expected utility between the two alternatives.

[4] In these examples, individuals seem to have stronger preference for education rather than other goods. In effect, preference for education varies across individuals and nations. In case of South Korea, this example is more likely applicable.

Among research on the behavior of educational choice, there has been little empirical study on individuals' risk preference (Breen et al., 2014). In recognition of this issue concerning educational decision-making, there are endeavors to account for the effect of risk preference, with particular attention to risk-averse individuals' behavior of educational choice (e.g. Breen et al., 2014; Brodaty et al., 2014). According to Breen et al. (2014), risk-aversive students seem to deter from the academically challenging option, while they prefer economically rewarding academic pathway. They also show that the students from the advanced socioeconomic background were likely to be irrespective of risk preference in their attitudes of educational choice (Breen et al., 2014). In terms of uncertainty of the expected returns, for example, Brodaty et al. (2014) find that uncertainty toward future earnings has a small effect while uncertainty of educational costs is significantly influential. In this regard, it is presumed that expected costs of education could be more important factor than expected future earnings in the educational decision-making.

Despite its pivotal role in understanding of the human behavior, rational choice theory is not able to avoid from the criticisms within and outside economics. For example, Monaghan (2003) claims that individuals act in a different way of rationality rather than self-interested or selfish behavior. Rabin (1998) also asserts that it is inconsistent with the notion of rationality when observing individuals' behavior with unstable preferences, judgmental error-makings and unpredictable information acquisition process and no pursuit of self-interest (Desjardins & Toutkoushian, 2005, p.192)

Nevertheless, it is argued by Desjardins and Toutkoushian (2005) that irrational behavior can be regarded consistent with the assumption of rationality. Preferences are based on subjective valuations which are unobservable and varying enormously among individuals (Desjardins & Toutkoushian, 2005). More importantly, rationality is defined on condition that individuals may not have perfect information in the decision-making process. Instead, individuals endeavor to make an optimal choice given the information at their disposal (Desjardins & Toutkoushian, 2005). It is the view of Beekhoven, De Jong and van Hout (2002), which supports that rational choice theory is a powerful explanatory framework to understand the behavior of educational choice of the individuals who make their choices based on their cost-benefit analysis of the alternatives

2.2Human capital theory

2.2.1 Education as a means of investment in human capital

The individuals' behavior of educational choice is further expounded by incorporating theory of human capital. Despite its long history of the notion of "human capital" by Adam Smith (Vaizey, 1972), this study mainly focuses on theory of human capital of Becker[5] (1975). Becker's human capital theory elaborates models and empirical analyses with reference to the individuals' investment in human capital with particular reference to training and education. In his theory of human capital, its core assumption is that education as a means of investment in human capital increases the quality and productivity of the labor force and hence generates higher level of future earnings (Becker, 1975). Accordingly, earnings of the individual worker are equivalent to the worth of marginal product, which is determined by her/his value of human capital. Put differently, the more investments an individual put into education, the higher earnings the individuals would gain. When it comes to the question of a dual nature of education either investment or consumption, many economists tend to treat education as the investment in order for the acquisition of assets of knowledge and skills from education. It is because education as a means of investment in human capital yields future benefits in the form of higher income compared to those in other forms from the consumption of normal goods (e.g. Shultz, 1961, 1971; Becker, 1975)

In order to grasp the behavior regarding investment in human capital, it is worth exploring the behavior of firms and employees with an example of training. Becker (1975), who sought for the effects of trainings on earnings through the mathematical interpretations, distinguishes the training to the two types, either general training or specific training: the former one is a kind of investment in acquiring general knowledge and skills while the latter one is a kind of investment in acquiring firm- specific knowledge and skills. Thus, it is regarded that general training is for common knowledge and skills, which can be utilized for any firms. Thereby, general training tends to be provided as the self-paid investment. In contrast, specific training is to enhance

[5] His book of "Human Capital" had been published in the years of 1964 and 1993 as well as 1975.

specific knowledge and skills which can be exploited only for certain firms. In this vein, firm-specific knowledge and skills would be perceived more valuable from the perspective of the firm as it is always expected that human capital enhanced by investment of firm, would lead to increase firm's productivity (Becker, 1975).

Based on the understanding of this mechanism of human capital, the firm inevitably provides firm-specific trainings to certain employees with firms' costs and consequently the firm's concern about a turnover of the trained employees arises (Becker, 1975). It is the rationale behind that the firm pays higher wages to the specifically trained in order to prevent a turnover of those employees and to maintain productivity enhancement. Contrariwise, the firm pays relatively lower wages to the generally trained who can easily leave relative to specifically trained. As stated in advance, a rational firm does act in order to maximize income by increasing productivity through the investments in human capital of employees. Likewise, a rational individual makes decisions which maximize utility by making choice of investment in human capital. Thereby, there are incentives for both the firm and the specifically trained to keep employment.

In terms of education, Becker (1975) claims that educational institutions are the locus specialized in the production of wide and diverse trainings, relative to firms providing trainings along with the production of goods. Institutions of higher education are thus the substitutes of specific trainings of the firms, for example, law and engineering schools which substitute sources of specific knowledge and skills for the law and engineering firms (Becker, 1975). Despite the differences between firms and higher education institutions in provision of training and education, investment in education is applied by the same logic of investment in training (Becker, 1975).

Becker (1975), in effort to account for effects of training and education[6] on earnings, mathematically illustrates earnings differentials. More specifically, the empirical expression of education and earnings is to elaborate as to how investment in human capital by the means of

[6] The basic assumption of wage differentials is that the firm operates under perfect competition where the marginal product equals to the wage as an equilibrium (Becker, 1975, p.37-38).

either training or education affect the future earnings. According to Becker (1975), there are key components in the equation of future earnings: direct costs of education including tuition, fees and associated expenses (k), forgone earnings during the education, and actual earnings of the student (MP: marginal product) (p.38-39). His first assumption is that the net earnings of college graduate (W) is the same as actual earnings (MP) minus direct costs (k) as the following equation (1).

$$W = MP - k \quad (1)$$

Putting foregone earnings[7] along with direct costs of education to the total costs (C=direct costs+ foregone earnings), the net earnings (W) can be calculated by deducting total costs (C) from the potential earnings of the individual after college graduation (MP^1) in the equation (2).

$$W = MP^1 - C \quad (2)$$

As C is equal to $MP^1 - MP - k$, the net earnings (W) thus can be expressed in the following equation (3):

$$W = MP^1 - (MP^1 - MP + k) \quad (3)$$

In comparison of the net earnings between university graduates (W^H) and high school graduates(W^N), let marginal productivity of the university graduates be MP^H and marginal productivity of the high school graduates be MP^N respectively. MP^H is supposed to be higher than MP^N as investment in education advances productivity. If direct cost of higher education is smaller than $MP^H - MP^N$, W^H will be higher than W^N.

Let us suppose that there is a binary option for being either a high school graduate or being a university graduate after 4-year higher education. Those options correspond to the two-different future net benefits for t periods respectively (PV^H and PV^N). In respect to the earnings by educational choice, the present value (PV) of the earnings differential between the university graduates and the high school graduates is shown in the following equation (4). Reckoning with

[7] It can be regarded as indirect costs or opportunity cost for education (e.g. Veizey 1972, Desjardins and Toutkoushian 2005).

time of labor market participation after university education, the equation includes the fifth year afterwards, one year after 4- year university graduation (Paulsen & Smart, 2001, p. 59).

$$PV^{H} - PV^{N} = \frac{Y^{H}(5)-Y^{N}(5)}{(1+r)^{5}} + \frac{Y^{H}(6)-Y^{N}(6)}{(1+r)^{6}} + \cdots + \frac{Y^{H}(t)-Y^{N}(t)}{(1+r)^{t}} = \sum_{t=5}^{t} \frac{Y^{H}(t)-Y^{N}(t)}{(1+r)^{t}} \quad (4)$$

Where Y^{H} is the expected earnings of the university graduate and Y^{N} is the expected earnings of the high school graduate. Thus, the present value of earnings differential is expressed with earnings differentials yearly and discount rate e.g. interest rate for t period from the fifth year. In conjunction with the present value of earnings differential, it is necessary to appraise the costs of education including direct costs (tuition, books and any associated expenses) and indirect costs (forgone earnings during the 4-year university education). Hence, the present value of costs (PV^{c}) is equated as follows (5).

$$PV^{c} = \frac{C(1)+E(1)}{(1+r)^{1}} + \frac{C(2)+E(2)}{(1+r)^{2}} + \frac{C(3)+E(3)}{(1+r)^{3}} + \frac{C(4)+E(4)}{(1+r)^{4}} = \sum_{t=1}^{4} \frac{C(t)-E(t)}{(1+r)^{t}} \quad (5)$$

Where C is direct costs of university education and E is earnings forgone during the education for four years. Based on the criterion of present value of net earnings, making choice of a pursuit of college education is worth investing if the present value of earnings differential $PV^{H} - PV^{N}$ is bigger than the present value of educational costs PV^{c} (Paulsen & Smart, 2001). A rational decision-making is to pursue higher education if the following result remains. Otherwise, an individual decides not to pursue higher education as costs are bigger than wage differential.

$$\sum_{t=5}^{t} \frac{Y^{H}(t)-Y^{N}(t)}{(1+r)^{t}} - \sum_{t=1}^{4} \frac{C(t)-E(t)}{(1+r)^{t}} > 0 \quad (6)$$

Although the framework of the present discounted value of future net benefits is helpful for decision-making between the alternatives, this approach is still limited in the absence of

consideration of preference and certainty level. In terms of preference, the rationality conditions of "comparability" and "transitivity"[8] should be met in the mathematical thinking.

Furthermore, a level of certainty is concerned by the individuals in their decision-making as certainty of certain outcomes influence their preferences among the alternatives. In this vein, a probability of expected outcome is mattered in the individuals' analysis. To continue from the same example of a binary choice of either having a higher education or not, let a probability of employment enters the equation as the status of employment is much concerned among the young. Let the probability of employment for a university graduate be p, thus 1-p is equal to the probability of unemployment. Likewise, let the probability of employment for a high school graduate be q and thus 1-q be the probability of unemployment. Accordingly, the expected net benefits will be expressed as $E(PV^H)$ in the equation (7) for a university graduate and $E(PV^N)$ in the equation (8) for a high school graduate. In the following equations, compared to the previous equations, not only earnings differential and costs but also probabilities of employment, p and q influence the expected present values of educational choice.

$$E(PV^H(t)) = p^* \left(\sum_{t=5}^{t} \frac{Y^H(t)}{1+r} - \sum_{t=1}^{4} \frac{C(t)-E(t)}{1+r}\right) + (1-p)^* \left(-\sum_{t=1}^{4} \frac{C(t)-E(t)}{1+r}\right) \quad (7)$$

$$E(PV^N(t)) = q^* \sum_{t=5}^{t} \frac{Y^N(t)}{1+r} + (1-q) * \left(\frac{0}{1+r}\right) \quad (8)$$

If the probability of employment for a university graduate p is lower than the probability of employment for a high school graduate q, the expected present values of net benefits of the two choices could be different compared to the present values without considering certainty level. If the probability of unemployment of a university graduate (1-p) is much higher than that of a high school graduate (1-q) and furthermore education cost is too high, there might be more risk-neutral individuals taking the option of not pursuing higher education. In other words, if expected value of higher education is lower than expected value without it, individuals will decide not to go to university and choose another best alternative.

[8] Comparability is one of the mathematical conditions that for example x and y in a set of S1 are ordered for comparison and transitivity is referred to the other condition that a, b and c in a set of S2 should be related each other.

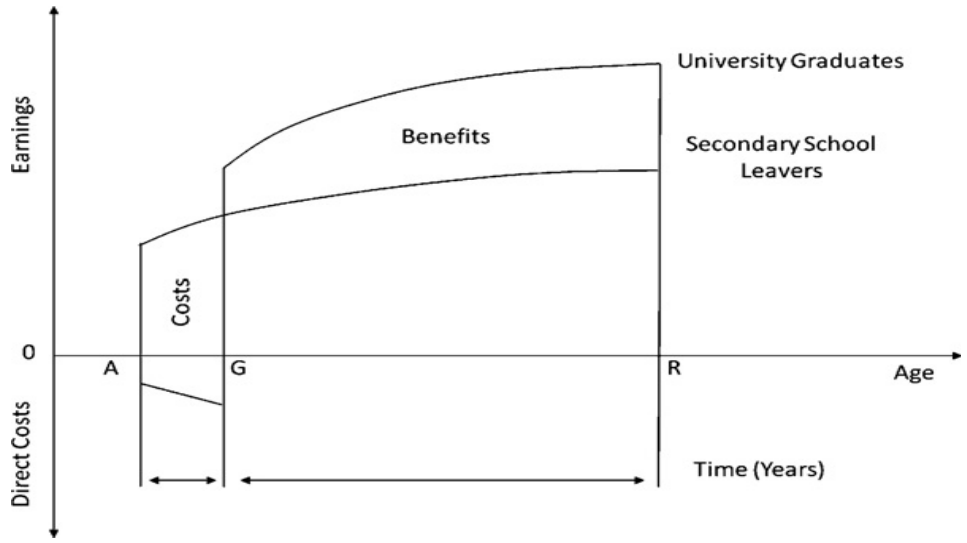
2.2.2 Monetary returns to education

In the discipline of economics of education, youth are regarded as adolescent econometricians (e.g. Manski, 1993; Paulsen & Smart, 2001). For example, Manski (1993) points out in the model of schooling choice that youth shape their expectations as much as "practicing econometricians" (p.49). More specifically, when it comes to educational decision-making, youth acts analogously with econometricians that they both use their data and knowledge to learn (monetary) returns to education conditional on the given information (Manski, 1993). Interestingly, many studies found that college students perceive the expected earnings of college graduates very accurately. It is further assumed that students can acknowledge future monetary benefits of higher education and there seems to be no systematic difference between expected and actual returns (Anchor et al., 2011).

As for the individuals' behavior regarding investment in education, it is critical to conceptualize as to how individuals perceive and make decisions on educational investment. With particular concern of decision-making whether to pursue a higher education, it is outlined that the individuals decide whether to pursue a higher education by questioning whether high education is a valuable investment (Paulsen & Smart, 2001). In a similar line of human capital theory of Becker (1975), other theories in the field of economics assert that individuals pay primary attentions to direct costs, foregone earnings as well as potential earnings between college/ university graduates and high school graduates (Psacharopoulos, 1995). By calculating the expected benefits for different choices and the expected costs incurred during higher education, the individuals reckon which choice would be more beneficial than another. In the extension of economic line of thinking, net earnings, which equals the expected benefits minus the expected costs, are the crucial element in the process of educational decision-making. Based on the process of comparing expected benefits and costs, individuals can develop a list of preferences and make the optimal decisions regarding education.

Figure 2. Stylized age-earnings profiles of Psacharopoulos (1995)

Source: Anchor et.al (2011, p.675)



As illustrated in Figure 2, both benefits and costs occur over time according to educational choice. There are two lines of earnings for a high school graduate and a university graduate respectively from the time of high school graduation (G) and until the time of retirement (R). For a high school graduate who start to make earnings, the curve of earnings begins at the point of graduation (A). For the individual who pursues university education, on contrary, there is a temporal and financial gap during the study (A-G) before making earnings. In other words, as for the university graduate, direct costs for 4-year university education and earnings forgone occurred during the education between A and G.

Being consistent with human capital theory, the earnings of the university graduate are likely to be more than those of the high school graduates between employment and retirement. Therefore, for the individuals having university education, the expected (monetary) benefits after completion of the education will surpass the expected benefits from high school education only. In other words, there exist earnings differentials between the high school graduates and the university graduates.

Furthermore, as mentioned before, the total costs are made up of not only the direct education costs but also the earnings forgone during the education, and those costs are a significant element considered in the individuals' educational decision-making. If education costs grow too much while benefits are the same, the expected value of higher education may become lower. Moreover, if earnings forgone become larger during the higher education ceteris paribus, the expected value of higher education will also become lower.

In a similar vein, a rational individual deciding whether to pursue higher education compares the differences of the net benefits -potential benefits minus costs- of the alternatives by applying the concept of discount rates (Paulsen & Smart, 2001). More specifically, it implies that the individuals estimate the present value of benefits and costs in the future between the alternatives. Indeed, every individual has a different value on the future relative to the present. Breen et al. (2014) argues that on the one hand, a person with a low discount rate prefers lower returns in the present to higher returns in the future, on the other hand a person with a high discount rate prefers higher returns in the present to higher returns in the future. The empirical study of Breen et al. (2014) shows that students with the preference of lower time discounting are likely to choose the continuation of further education, which would yield higher returns to education.

As previously elaborated, earnings differential between university graduates and high school graduates seems to be a simple and convenient tool to measure the monetary returns to investment in higher education (e.g. Paulsen, 1998; Paulsen & Smart, 2001). According to Paulsen and Smart (2001), for example, the earnings differentials between high school graduates and college/university graduates became larger overtime between 1979 and 1997 in the USA.

There are two measures in use to examine the financial impacts of education: the earnings differential and private (monetary) returns to education. Instead of the earnings differential, which is relatively simple and straightforward, private rates of returns to education have drawn the economists' attention. Psacharopolous (1985) pinpoints that the rates of private returns to education have been utilized as an integral indicator for the individuals in the educational decision-making. It is also the view of Menon (1997) that the rates of returns to education are

integral determinant when the individuals make decision-making on whether to pursue higher education.

From 1967 onwards, there have been primarily the two methods to calculate the private returns to education: one is the Mincerian earnings function; and the other is the elaborate method which requires comprehensive data (Anchor et al., 2011). So far, it is known that those methods have both advantages and disadvantages in calculation of the private returns to education, thus the short method[9] was initiated by Psacharopoulos (1981) as an alternative (Anchor et al., 2011). What is common among three methods albeit with different approaches is that the calculation of the rates of return to education is based on information of the private benefits (after-tax earnings differentials) and costs (direct costs plus earnings forgone during education) as well as interest rates of educational investment (Paulsen & Smart, 2001).

In regard to the change of rates of returns to education, Paulsen and Smart (2001) conclude that ceteris paribus, the rate of return to higher education will be higher and the participation of higher education will be also higher if: the earnings differential between university graduates and high school graduates is greater; the direct costs of higher education are lower; the earnings forgone during higher education are lower; or the students are less present-oriented. More briefly, a rational individual will decide to pursue higher education if the rate of return to higher education becomes higher. If the rate of return to higher education is lower, on the other hand, an individual is unlikely to make a choice of higher education.

In the empirical studies of Psacharopoulos (1985, 1995) conducted at the international level, it is found that the rates of returns appear to decline as the average level of education goes up. In effect, the rates of returns to basic education are higher than the rates of returns to higher

[9] The short-cut method is originally suggested by Psacharopoulos (1981), which was developed as the alternative between Mincerian earnings model (1974) and the elaborate method of private return to higher education by Psacharopoulos. According to Anchor et al. (2011), the function is shown as: r=Eu – EsS · (Es + C), where r is the monetary rates of return to university education, Eu is earnings of an individual with university education, Es is earnings of an individual with upper-secondary education, S is years of university education and C is the university education costs (p.676-677). As claimed by Psacharopoulos (1995), it is presumed that rates of monetary returns to higher education have become lower over time as the economy has grown and average educational attainment has become higher in South Korea.

education in most cases and it is due to the fact that the basic education is not costly in most cases. Nevertheless, earnings premium is indeed likely to be much higher among the individuals with higher education compared to those with lower education levels. Psacharopoulos (1985) discovers that the returns to human capital investment were higher than returns to physical capital investment in the developing countries, while those to human capital investment were lower than those of physical capital investment in the advanced countries. Furthermore, Psacharopoulos and Patrinos (2004) show that low- and middle-income countries tend to have higher returns to education relative to lower returns to education between high-income countries. According to their estimation, the average returns to education have decreased by 0.6% along with increase in average education level across the countries during the past 12 years (Psacharopoulos & Patrinos, 2004). In this vein, it is claimed by Psacharopoulos and Patrinos (2004) that the expansion of education causes decline in the returns to education. More importantly, it is also asserted that the returns to 'human and physical capital' are likely to be evened at the marginal level especially for the nations with the advanced industrialization (p.118).

Albeit with its magnitude of the rates of returns to education based on the monetary benefits and costs, what should be considered is that significance of monetary aspects is perceived differently among the individuals. Furthermore, Paulsen and Smart (2011) emphasize that there are other factors i.e. non-monetary, intangible and inaccessible determinants affecting the educational decision-making. For example, individuals have different socioeconomic background, academic ability, educational, financial and employment opportunities in relation to the educational decision-making (Paulsen & Smart, 2011). As it was outlined by Becker (1975), "attitude toward college life and studying, the kind of work college graduates do, and other psychic factors are relevant as well as the gain in earnings" in the individuals' choice of higher education (p.198). Becker (1993) also states that individual differences and inequalities exist given significant correlations between earnings and gender, race, ethnicity and discrimination in the labor market (Paulsen & Smart, 2011). Therefore, it is remained that it is not easy task to take into consideration all the relevant factors. It is the view of Becker (1975) that "a treatment of the full private rate is exceedingly difficult" to measure (p.198).

2.2 Sociological rational choice models

This section casts light on the sociological viewpoints with respect to educational choice on the grounds of individual rationality. Sociological rational choice theories have been developed in response to the issue of educational inequality, which are prevalent in many societies. Given that there have been the conventional economic models, which primarily focus on the economic returns to education, the sociological rational choice theories instead endeavor to account for the individuals' behavior of educational choice beyond a limited explanation within the discipline of economics (e.g. Breen and Goldthorpe, 1997; Becker & Hecken, 2009; Morgan, 2005; Jæger, 2007). Furthermore, the sociological rational choice models include not only economic value but also social value of education (Jæger, 2007). In terms of magnitude of the economic value of education, Becker and Hecken (2009) assert that individuals outweigh maintenance of social status than the expected economic returns to higher education in the educational decision-making. On contrary, Jæger (2007) shows that economic returns to education are likely to be perceived more importantly than social returns to education among individuals.

Albeit with different approaches between rational choice theories based on economics and sociological rational choice models, it is important to note that those concepts are primarily based on the assumption that individuals act in "a (subjectively) rational way" in making choices (Breen and Goldthorpe, 1997, p.298). More specifically, it is the underlying notion that a utility-maximizing individual makes choice between the alternative educational options based on the evaluation of the expected returns to education (e.g. Breen and Goldthorpe, 1997; Jæger, 2007).

In the empirical study of educational choice, Breen and Goldthorpe (1997) establish a model consisting of three mechanisms: 1) relative risk aversion; 2) academic ability and consequently expected probability of success during education and; 3) finally, costs of education (p.279-82). First, the mechanism of relative risk aversion plays a role as a linkage to understanding relationship between the class differential and the educational choice (Breen and Goldthorpe, 1997; Breen et al., 2014). According to Breen and Goldthorpe (1997), relative risk aversion is applied in order to explain that different social class levels have different degrees of educational motivation. While admitting the existence of the class differentials in contemporary society,

family background is likely to be one of the crucial determinants affecting the educational decision-making. It has been claimed by Breen and Goldthorpe (1997) that the educational choice reflects a desire of the advantaged class to keep the same level or to move up the social class. In contrast, relative risk aversion of the lowest social class is likely to be relatively weaker compared to the upper classes. In this context, relative risk aversion refers to the status maintenance, implying that individuals have a common desire to maintain or advance social status while avoiding downward social mobility (e.g. Breen and Goldthorpe, 1997; Breen et al., 2014).

More intriguingly, what is argued by Breen and Goldthorpe (1997) is that educational choice is derived from the desire of families, more specifically from parents, who want to assure that their children are subject to upward mobility or at least maintenance of given social status rather than downward mobility. In this regard, Becker (2003) also stresses that intergenerational status maintenance is a crucial motive for the parents to whom education has given benefits. Therefore, parents' education seems to be influential in terms of educational opportunities of children and the children having parents with higher level of education are more likely to pursue higher education (Becker, 2003). In this vein, parents play an important role in the children's educational decision-making while maintenance of social status is the rationale behind it (e.g. Breen & Goldthorpe, 1997; Breen et al., 2014).

It is convinced that class differential is also associated with the individual's academic ability and thus the expected probability of success during education. According to Boudon (1974), there are two types of effects, primary and secondary effects stemmed from the social stratification. The primary effect refers to the effect of social origin to students' cognitive skills, scholastic interest and academic accomplishment, while the secondary effect refers to the social class differentials in the decision-making of education (Becker & Hecken, 2009). In the empirical study of individuals' participation of upper-secondary education in Germany, it is shown that the primary effect of the origin of the social class has negatively associated with the academic performance among the students (Becker, 2003). This supports that academic ability and in turn the expected likelihood of the educational success differs among the social classes.

When the costs of education enter in the utility function, a rational individual would take further education if and only if resource level is bigger than the amount of educational costs including earnings forgone (Breen & Goldthorpe, 1997). Apparently, the assessed costs of higher education are impactful in the individuals' choice of higher education. It is the view of Becker and Hecken (2009) that there will be obvious divide between the social classes. According to them, the expected costs of higher education have a greater impact to the individuals of the lower social class relative to those of the upper class. It is also asserted by Breen and Goldthorpe (1997) that changes in the educational costs have different degrees of impact across the social classes and as a result, there will be impacts on the educational attainment between different social classes. Therefore, increase in the educational costs is more impactful among the lower level of social class and it leads to the low rates of the educational attainment of the lower level of class.

The subjective expected utility model, which is originally developed by Esser (1999), offers the essential concepts with respect to the behavior of educational choice (Becker, 2003, p.3). In the model, individuals make educational choices based on their subjective expected utility between the alternative options. Let us assume that there is a binary choice for an individual as to whether to pursue higher education in the modified model. The individual, who is a utility-maximizing rational agent, makes a decision from the intrinsic calculation of the expected utilities of the alternatives. The subjective expected utility from a pursuit of higher education (HE) and the subjective expected utility from no pursuit of higher education (NH) are shown in the different utility functions (9) and (10) respectively in the following (Becker & Hecken, 2009, p.29).

$$SEU(HE) = pB + (1 - p)q(-D) - C, \quad (9)$$

$$SEU(NH) = q(-D), \quad (10)$$

where

- B are the benefits of social status
- - C are the all costs accruing from higher education

- - D is status decline[10]
- p represents probability of success during education
- q represents probability of status decline due to a discontinuation of education

An individual will decide to pursue higher education if the subjective expected utility of higher education is higher than that of no higher education. Hence, in the decision-making between the binary options, the following equation (11) is prerequisite for a decision of a pursuit of higher education:

$$SEU(HE) > SEU(NH) \quad (11)$$

$$pB + (1 - p)q(-D) - C > c(-D) \quad (12)$$

And it is simplified to:

$$B + q \cdot D > C/p \quad (13)$$

$B + q \cdot D$ on the left side of equation (13) refers to the educational motivation of an individual, whilst C/p on the right side of equation (13) refers to the investment risk of an individual (Becker & Hecken, 2007; Becker, 2003). Between a binary choice, an individual will prefer a pursuit of "higher education if, and only if, the educational motivation is higher than the investment risk (Becker & Hecken, 2007, p.29)".

In literature of sociological rational choice, there is a relatively new concept of the total utility of educational choices suggested by Jæger (2007). According to him, utility arising from the educational choice comprises both expected monetary and non-monetary(social) returns to education. In his empirical model, the utility function is made up of the expected economic returns e, social returns s, and x, which includes the constraints of opportunity due to socioeconomic background and scholastic ability (Jæger, 2007). With respect to the economic and social returns to education, it is claimed that the contextual factors such as the peer-group effects, the school

[10] The status decline is referred to the outcome of the choice of educational paths which do not ensure keeping intergenerational status (Becker 2003).

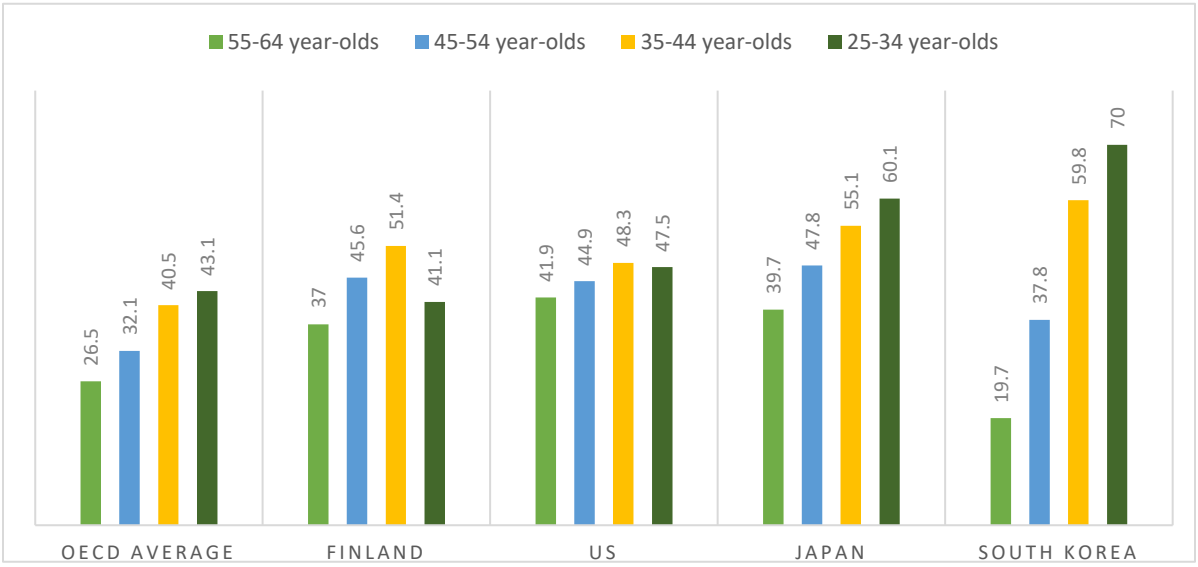
effects and the labor market condition as well as the family background are important factors in the models (Jæger, 2007). According to the empirical results from the study of choice of upper-secondary education in Denmark (Jæger, 2007), higher values of economic and social returns to education are likely to be positively associated with a higher probability of further education. In addition, it is shown that the economic and social returns to education have independent effects on the educational decision-making (Jæger, 2007). All in all, it is stressed out by Jæger (2007) that individuals make educational decisions to maximize a complex utility comprising not only economic but also social returns to education influenced by family background and interaction with peers. By all accounts, it is obvious that the educational choice from the perspective of the sociological rationality literature is also derived from the rational choice framework.

3. Choice of higher education in South Korea

Sandefur and Park (2007) have drawn attention to the fact that South Korea has been one of the most educated nations in the world since the late 20th century. This is supported by the fact that approximately 7% of the population aged 25-34 had been through higher education in the mid-1970s and 28.8% of the corresponding age cohort were enrolled in higher education institutions in 1995 (Kim & Lee, 2006). Since then, the number of university graduates has increased by 40% within the two decades (OECD, 2018). In 2016, 7 out of 10 among the population aged 25-34 are the graduates from junior colleges and universities in South Korea compared to the OECD average of 4.3 out of 10 (OECD, 2018).

As illustrated in Figure 3, Japan and South Korea have had growing shares of higher education across the generations; however, it is noticeable that Korea has had rapid increases in the shares over each generation, compared to the modest increases of share with higher education across the generations in Japan. The difference of the shares with higher education between the oldest cohort and the youngest cohort is just 20% in Japan, whilst it is 50.3% in South Korea as of 2016 (OECD, 2018). In other words, the share with higher education among the population aged 25-34 is more than triple that of the population aged 55-64.

Figure 3. Share of population with higher education (2016), source: OECD, 2018



Unlike Japan and South Korea, the USA and Finland seem to have different trends across generations. In case of the USA, the share of higher education among the youngest generation is lower than that of the second youngest cohort, population aged 35-44. As for Finland, it is even more interesting as the share of higher education of the youngest population is much lower than the groups aged 35-44 and 45-54. Nevertheless, the overall shares of higher education are likely to grow over the generations across the OECD nations (OECD, 2018). Above all, it is clearly shown from the international comparisons that South Korea has undergone such a remarkable expansion of higher education across the generations.

With respect to the expansion of higher education, Cho (2016) states that faith in education has generated an explosive expansion of higher education across the social classes along with industrialization, modernization and democratization since the latter part of the 20th century. Moreover, Kim and Lee (2006) point out that educational policies in response to social demands have facilitated further educational investments as well as educational attainments in Korean society. In line with these arguments, the expansion of higher education in South Korea seems inevitable in the dynamic social and economic transitional process.

In order to understand the large-scale expansion of higher education from the socioeconomic and political perspectives, it is worth investigating various institutional and structural aspects in Korean society. Kim and Lee (2006) point out that Korean society has faced burgeoning demands for higher education following a substantial expansion of basic education since the beginning of industrialization in the 1950s and 1960s. A small number of public institutions of higher education apparently could not accommodate the explosive demand for higher education by the significant expansion of high school graduates. In consequence, since the 1980s the government has conducted educational reforms by abdicating tight control on the number of admitted students and started counting on private investment in higher education institutions (Kim & Lee, 2006). The reform has been sufficiently effective, for example, by leading to admissions 30% in access of the quota of graduation in 1981 (Sandefur & Park, 2007).

An even more dramatic expansion was observed during the 1990s, for example, 45% of female and 50% male high school students pursued higher education in 1990 and even further, 70% of

female and 76% of male students obtained a 2-year college or 4-year university education in 1995 (KEDI, 2000). The 1990s in South Korea are known as the era of democratization after the ending of the authoritarian regime in 1987. In regard to the number of institutions of higher education in South Korea as there are currently 330 institutions made up of 194 4-6 year universities and 136 2-4 year junior colleges, which can accommodate approximately 555,000 students (www.academyinfor.go.kr).

Despite the liberal educational reforms in the past, Kim and Lee (2006) claim that the Korean government has still maintained robust controls and regulations toward institutions of higher education. Furthermore, they argue that the highly standardized educational system has prevailed in South Korea mainly due to substantial governmental intervention in terms of education. Thus, the private institutions in particular have been appealing for further autonomy of institutions of higher education from the government (Kim & Lee, 2006).

In terms of the educational system in South Korea, there are nine years of basic education comprising six years of primary school and three years of middle school education. Thereafter, a majority of students continue education by either enrolling in general high schools or specialized high schools such as high schools for science and foreign languages, or in vocational high schools. On completion of high school education, students typically pursue higher education either in junior colleges or universities. Compared to the Germany and Finnish educational systems where vocational education has been fostered, Sandefur and Park (2007) point out that South Korea has retained academic-oriented educational policies, which have consequently resulted in a lower priority being placed on vocational education at the national level.

As described previously, South Korea has had a mixed system of public and private education providers. The public institutions of higher education account for only one quarter while three quarters of the institutions are private (Kim & Lee, 2006). The finances of private institutions rely heavily on tuition fees collected from the students and households. According to OECD data (2014), the spending on higher education in South Korea has been overly weighted toward private expenses (65.7%) compared to relatively smaller public funding (34.3%). From the financial point of view, South Korea belongs to the group of nations along with Australia, Chile, the US,

Japan and the UK, where the private expenditure exceeds the public expenditure on higher education in 2014 (OECD, 2018). For example, those nations are in striking contrast to Finland in which higher education is funded by 96.5% of public expenditure with 3.5% of private costs.

Indeed, in South Korea, the costs of higher education have been steadily on rise and exceptional acceleration has occurred between 1995 and 2010, especially among the private higher education institutions. According to the Ministry of Education of South Korea, average tuition fees for one year were 5,600 € for the private institutions and 3,140 € for the public institutions in 2005. The peak was in 2010 with 5,720 € for private and 3,278€ for public institutions[11]. Those figures have become slightly lower since 2010 as a result of governmental regulation policy on the costs of higher education. As a further remedy, the government has decided not to impose any admittance fee for higher education from 2019. Nevertheless, Kim and Park (2017) emphasize that the costs of higher education in South Korea are not a nominal amount.

Given these all circumstances in South Korean society, it is of interest as to how academics explain the massive expansion of higher education especially in South Korea. One of prevailing theories in respect to the expansion of higher education is modernization theory. According to this theory, the more industrialized society becomes, the more powerfully educational attainment influences occupational status (Treiman, 1970). Modernization theory also predicts that the returns to education would increase continuously as technologically advanced industries will be burgeoning and thus there will be more jobs in need (Sandefur & Park, 2007).

From a different point of view, Collins (1979) argues that the expansion of educational attainment is a product of competition between superordinate and subordinate groups. He claims that superordinate groups make an effort to maintain their positions in the ladder of occupational status while subordinate groups make an effort to achieve access to those same occupational positions. Hence, Collins (1979) concludes that competition between different social groups entails an increase in educational attainment over time.

[11] Korean currency (Won) has been converted to Euro with the current currency exchange rate as of 24.04.2018: 1,000 WON=0.76 €. Therefore, tuition fees given in Euro are intended for use only for comparison over time. Actual education costs would differ.

Another theory with respect to expansion of higher education is the notion of 'positional goods'[12] is introduced. Positional goods refer to goods consumed for a different purpose, which can be distinguished from the consumption of normal goods. According to Hirsch's theory (1976), investment in higher education is to show the value of positional good. In other words, the pursuit of higher education has an effect of revealing economic status, therefore, if household income rises, investment in education will grow (Cho, 2016). In this way, it can be argued that the expected value of higher education would include potential benefits such as the ostentation of wealth and social status and credential effect.

According to Cho (2016), higher education works as two modes in South Korean society: one mode is to move up the social scale based on the conventional meritocracy, and the other mode is to reinforce the educational inequality and to stabilize the social classes through the fierce competitions. Cho (2016) remarks that due to conflicting modes of higher education, people deem higher education to be a decisive path for social mobility in South Korean society. Furthermore, it is claimed by and large that higher education attainment has been perceived as one of the most effective practices to produce more job opportunities; to ensure higher earnings in the future; and to ascend social ladder (e.g. Kim, Kim, Jaquette & Bastedo, 2014; Jung & Lee, 2016).

However, at the same time the explosive expansion of higher education is likely to amplify educational and social concerns and labor issues in Korean society. Such risks were first identified by Freeman (1975), who pointed to potential problems such as the declining wages of the highly educated due to the expansion of the educated labor force in the U.S. labor market during the 1970s. In a similar vein, South Korean society has experienced academic inflation since supply of the highly educated has exceeded the demand for those in the labor market (e.g. Sandefur & Park, 2007; Lee et al., 2016).

In addition to the labor market issue, there have been other topics associated with the excess supply of the highly educated. According to Berg (1970), for example, employers intentionally changed their hiring criteria in response to an increased supply of university graduates after World

[12] According to Hirsch (1976), positional goods are defined as goods and services which distinguished one from another by activity of consumption (Cho 2016)

War II in the USA. Likewise, a university degree has become insufficient for higher occupational and social positions in South Korean society (Jung & Lee, 2016). Moreover, Gerber and Cheung (2008) highlight that employers tend to estimate not only educational credentials but also additional criteria such as the prestige of institution, the school brand and others. Consequently, there has been fierce competition to enter the prestige universities in order to achieve value-added educational effect on the returns to education (Jung & Lee, 2016). In this regard, Kim (2004) concludes that simply improving the level of education is no more advantageous in the Korean labor market because of two reasons: first, college/university education has been enormously generalized; and second, the overall level of educational attainment has also been advanced.

With respect to the educational effects on occupational status in the international comparisons, it is indicated that Korean higher education is not likely to be effective on occupational outcomes. For example, the employment rates of university graduates among the population aged 25-64 in South Korea have been consistently lower than those of the OECD nations having employment rates of 83-85% (OECD, 2018). As of 2016, the employment rate of university graduates in South Korea was 77.3%, which is lower than those of Finland (81.6%), Japan (88.3%), the US (81.6%) and the OECD average (84.3%). Furthermore, in terms of the job security of university graduates in South Korea, it is noticeable that there is indeed a high share of non-regular positions, i.e. fixed-term, part-time and temporary works, which are more than double the average of the OECD in 2012 (Jung & Lee, 2016). In addition to those issues, problems such as institutional selectivity, education-work mismatch and gender inequality in the labor market have also appeared to be prevalent in South Korean society (e.g. Sandefur & Park, 2007; Cho, 2016, Jung & Lee, 2016). The expansion of higher education could generate an increasingly stigmatized society especially for the individuals with lower education as the opportunity for employment would be lowered (e.g. Solga, 2002).

There have been numerous studies to account for these social issues associated with the expansion of education. For example, Kreidl et al. (2004) claim that industrialized societies and individuals in those societies invest too much in education therefore it causes a surplus of highly educated workers. The excess of the highly educated consequently leads to the devaluation of academic credentials and thus lower returns to education. In a similar respect, it is also argued by Müller

and Shavit (1998) that due to the credential inflation, the more qualifications of higher education there are, the weaker the association there will be between educational attainment and occupational return.

In attempt to account for the phenomenon of expansion of higher education, it therefore becomes more intriguing to inspect the individuals' expected value of higher education. What is primarily assumed is that the individuals expecting higher returns to higher education compared to the other options makes a choice of higher education. In consequence, it seems imperative to examine the returns to higher education, in other words as to which level of expected value of higher education is necessary for the individuals to choose higher education. In this vein, it is anticipated that exploring the actual returns to education including occupational returns, monetary returns[13] and non-monetary returns would allow us to identify the expected value of higher education among individuals particularly in the context of South Korea.

According to Psacharopoulos and Patrinos's (2004) estimation at the international level, monetary returns to higher education of low- and middle-income countries tend to be higher than those of high-income countries. Furthermore, they show that the average returns to education are likely to decrease owing to an increase in the average education level across countries (Psacharopoulos & Patrinos, 2004). It is presumed, therefore, that expansion of education results in a decrease in returns to education in the long run in South Korea. Indeed, there has been evidence in line with the change of rates of returns to higher education. For example, the monetary rates of return to higher education remained substantially high compared to lower levels of education between 1976 and 1986, however the rates have declined rapidly between 1986 and 1991 (e.g. Ryoo et al.,1993; Nam, 1996). In the view of Müller and Shavit (1998), an excessive supply of university graduates lowers the value of a university degree in the labor market. In the same way, there has been an assertation that education attainment appears to be less important and particularly occupational returns to higher education have been in decline over time (Kreidl et al., 2004).

[13] Monetary returns to education are regarded as the same as private, financial and economic returns to education in this paper.

More importantly, the decreasing effect of educational qualification, in particular, for the female workers seems to be persistent than the male workers in segregated society such as South Korea. It is supported more firmly by the empirical results of educational effect on occupational status. Sandefur and Park (2007) stress that the effects of education have been significantly in decline across cohorts among female university graduates whilst the effects of education among male seem to be sustainable. In the labor market of South Korea, age is perceived as a positive signaling of experience and maturity for male. In contrast, age tends to be a negative signaling for female (Sandefur & Park, 2007).

Although the social problems mentioned previously cannot be attributed solely to the explosive expansion of higher education, increasing participation rate of the highly educated labor force seems, however, to be closely related to academic inflation or credential inflation (Kreidl et al., 2004). Higher education appears to guarantee neither status of employment nor an appropriate form of employment. As a consequence, Jung and Lee (2016) assert that the likelihood of a highly ranked social position and monetary as well as non-monetary returns to higher education tend to become lower over time.

4. Hypotheses

This paper so far has discussed the individuals' choice of higher education on the theoretical framework of rationality and furthermore, the expansion of higher education as the prominent phenomenon in South Korea. In making sense of the massive expansion of higher education in South Korea, it seems imperative to explore the individuals' educational decision-making behavior from the perspective of microeconomics and sociology of education based on the rationality framework. In doing so, what is anticipated is that the phenomenon of higher education expansion could be further accounted for through the lenses of rationality framework. Hence, this study endeavors to cast light on the behavior of individuals' educational decision-making particularly examining determinants affecting higher educational choice in the context of South Korea. Moreover, actual returns to education are investigated to find out to what extent higher education affects occupational, monetary and non-monetary status among the individuals. As for the case nation, South Korea seems to successfully provide educational opportunities in response to the social demand. Indeed, the expansion of both demand and supply for higher education is likely to be an integral element for the modern South Korea to emerge as one of the most educated societies on the globe.

As a primary assumption derived from rational choice theory, human capital theory, and sociological rational choice theories, it begins with the line of thinking that educational decision-making whether to invest in higher education occurs according to their intrinsic calculation of expected values between the alternatives. In the setting of a binary choice regarding a pursuit of higher education, a rational actor is likely to calculate and compare the expected values of the two options. Furthermore, it is further assumed that an individual opts for the option which maximizes expected utility derived from the educational choice.

Sociological theories of rational choice are particularly applicable in the behavior of higher educational decision-making. According to the sociological framework based on rationality, the expected value of education comprises not only monetary but also non-monetary returns to education. Putting another way, both monetary returns, i.e. earnings and non-monetary returns such as upward social mobility and educational credential effect are considered as the components

of expected value of higher education (e.g. Breen & Goldthorpe, 1997; Breen et al., 2014; Jæger, 2007). It has been argued in common that family background and peer effects are impactful elements affecting the total expected value of educational options (Jæger, 2007).

Based on these underlying assumptions, this study endeavors to elaborate individual and socioeconomic level of factors influencing educational decision-making. Furthermore, expected returns to education are examined to account for the behavior of educational decision-making. In addition, the analysis of actual returns to education is anticipated to figure out any change of returns to education. Despite its significance of examination of institutional and policy levels, this study narrows down its scope to micro-level by paying attention to the behavior of individuals with respect to the choice of higher education.

Based on the literature review, the following hypotheses are set up for empirical tests:

1) The individual and socioeconomic levels of background is the significant determinants in the individuals' higher educational decision-making.
2) In individuals' decision-making on higher education, the expected monetary returns to education are more significant determinants than expected non-monetary returns to education.
3) Monetary returns to education are higher among the individuals with a higher level of education than those to a lower level of education.
4) Non-monetary returns to education are higher among the individuals with a higher level of education than those with a lower level of education.
5) An individual would choose a pursuit of higher education as the monetary and non-monetary returns to education are higher than those with relatively lower levels of education.

5. Empirical model

For the analysis of the behavior of the individuals' decision-making regarding higher education, the notion of total expected returns to education is opted for. The empirical analysis, therefore, is constructed based on the model of total expected returns to education suggested by Jæger (2007, p. 466). The key concept of the model is that not only expected monetary returns but also expected non-monetary returns perceived by individuals are the factors in the educational decision-making. Therefore, in his empirical study, the expectation in respect to the monetary and non-monetary benefits are captured in the estimation of the educational choice.

$$P(Y_i = j | e_i, s_i, x_i) = \frac{\exp\left(\alpha^j + \beta^{1^j} e_i + \beta^{2^j} s_i + \beta'^{3^j} x_i\right)}{\sum_{j=1}^{j} \exp\left(\alpha^j + \beta^{1^j} e_i + \beta^{2^j} s_i + \beta'^{3^j} x_i\right)}, \quad (j=0,1,2),$$

Jæger (2007) introduces three different types of logistic models in his study, however he argues that the model of Stereotype of Ordered Regression (SOR) is more appropriate for the multiple educational choices relative to two other models such as Multinomial Logit Model (MLM) and Ordered Logit Model (OLM) (p. 466-468). One of the models shown above is a typical function of multivariate logistic regression with a multinomial or ordered outcome comprising three different educational choices after elementary education. The outcome is a dummy variable of educational choice j, either 0= secondary education, 1= vocational education, or 2= upper secondary education. The probabilities of the outcome Y^j depends on the expected economic returns e, the expected social returns s, and the vector of background variables x, referring to the constraints of opportunity including family background, demographic characteristics and academic ability (Jæger, 2007). The β^j represents coefficients of e, s, and x respectively, which are logarithmic values of the odds in the model.

He pays considerate attention to the students' expectation toward economic and social benefits from education (Jæger, 2007). In his study, the expected economic returns to education are captured from a survey question asking to what extent she/he has a desire for high earnings in the future, while the expected social returns to education are derived from another question asking

the significance level of educational choices of her/his friends. For the socioeconomic factors, he utilizes the variables such as socioeconomic status of family, parents' education levels, type of family and sibling size. Moreover, for the individual level of factors, he chooses gender, ethnicity, PISA reading ability test and for the school factors. Furthermore, he opts for type of elementary school as to whether it is private or public. He additionally includes the instrumental variables to examine potential exogeneity of the variables of expected economic and social returns to education (Jæger, 2007).

In terms of the results, his empirical findings show that economic and social returns exclusively affect the educational choices of the students and moreover, the economic returns to education tends to be slightly more important than the social returns to education (Jæger, 2007). In addition, the expected returns to education seem to be shaped by family background as well as by the peer effects. By these accounts, Jæger (2007) concludes that expected economic and social returns to education should be perceived as the core elements of total expected utility of educational choices. In furtherance of total utility, individuals make educational decision by bearing in mind those economic and social returns based on individual and socioeconomic levels of background. Although he points out that social returns to education stemmed from the peer effect are important in the decision-making with regard to the lower level of education, it is presumed that peer effect might be less significant in the choice of higher education. Therefore, peer effect is not considered in this paper.

6. Methods, data and variables

6.1Research methods

Since the main point of this study is to shed light on causal relations between the factors such as expected returns to education and individual and socioeconomic backgrounds and the outcome of choice of higher education. Furthermore, there is another aim to explore the educational effects on the status of employment and the monetary and non-monetary returns to education. In this vein, it is inevitable to conduct the statistical analyses with the appropriate datasets for the estimation and prediction.

In order to test hypotheses constructed from the theoretical framework, two main analyses are proceeded. The first analysis is binary logistic regressions to estimate probabilities of choice of higher education by eight predictor variables. As predictors, expectation and beliefs toward future job, individual-, school-level factors and socioeconomic factors are considered in the model. Thus, it is expected to find out that which factors significantly influence the higher educational decision-making for the individuals who maximize total utility from the choice. The second part of analysis is to figure out the educational effects on the actual returns to education by examining the status of employment, earnings and job satisfaction at the time of eight years after high school. The second analysis is also intended to draw a broad picture of monetary and non-monetary returns to education in comparisons with education level, cohort and gender.

6.2Data

The empirical research is based on the database 'Korean Education and Employment panel (KEEP)' which is easily attainable from the website of 'Korea Research Institute of Vocational Education and Training (KRIVET)'[14]. The panel datasets have been accumulated every year since 2004 (wave 1) with the initial subjects of 6,000 middle school and general and vocational

[14] KRIVET, http://www.krivet.re.kr/eng/eu/index.jsp

high school students and their households and schools. The latest dataset available online is the KEEP data in 2015 (wave 12) as well as all the KEEP datasets starting from 2004 (wave1) in Korean language and partly in English language.

The KEEP has been framed to compare between the two cohorts. In the first panel survey in 2004, there were 2,000 students from middle school (hereafter M_cohort), 4,000 students from vocational and general high schools (hereafter H_cohort). In addition, new 1,500 students of M_cohort have been included since 2007 (wave 4). Furthermore, 759 male college/ university graduates (hereafter C_male) have joined since 2010 (wave 7) for the comparisons between the female group of H_cohort and the corresponding male group. In South Korea, young and sound men are subject to perform military duties for 2-3 years as mandatory due to the national security issue. Thus, males, by and large, start participating in the labor market at least 2-3 years later relative to females. That is why C_male group is added in the panel survey to compare females and males who participate in the labor market around the same time. In terms of age, C_male is the oldest group followed by H_cohort and M_cohort. Therefore, except the comparison by gender, H_cohort and M_cohort are mainly concerned in the analyses. All in all, the KEEP observes 8,257 individuals comprising cohorts of H_cohort, M_cohort and C_male since 2010.

With respect to the datasets used for the analyses, I have utilized datasets of the individual and household surveys. A further detailed information on the datasets and variables is described in the appendix I.

For the first analysis, the datasets only from H_cohort are exploited since the household data of M_cohort do not provide information in terms of parents' education level. Thus, H_cohort's individual and the household datasets of 2004 are examined for further investigation of the individual, school and socioeconomic levels of background. In the 2004 KEEP survey, the response rate of high school students was 100% with 4,000 samples. And, 97% (N=3,880) of the students' household responded for the household survey.

For the second analysis of the actual returns to education, it is required to have information regarding the present status. In order to explore any changes of the returns to education over

time, there is the comparative analysis of the two cohorts, H_cohort and M_cohort. In addition, C_male is also employed in order to compare with females of H_cohort so that it is available for the educational effects by gender in South Korean society. After all, the datasets of H_cohort, M_cohort and C_male are in use for the second analysis. For the current status of three different groups, I utilize the datasets of 2012 for H_cohort and C_male and the dataset of 2015 for M_cohort. The latest dataset of 2015 (wave 12) is the one which is accessible to the most recent information on the status of M_cohort. Therefore, for the cohort comparison, the 2012 (Wave 9) data is examined for H_cohort. It is assumed that eight years after high school would be enough for observation of the individuals to gain information on the current status especially regarding occupational and socioeconomic status. As of the 2012 KEEP survey, the response rates were 76.4% (N=2,514) for H_cohort and 80.1% (N=719) for C_male. In case of the 2015 KEEP survey, 80.9% (N=2,496) of M_cohort responded.

6.3Variables

6.3.1 Variables of logistic models

In the first analysis, I have chosen a binary variable as the outcome variable (choice of higher education) and eight explanatory variables including individual, school levels and socioeconomic level as well as expected value of job in the binomial logistic regression models. Total number of observations is 2,458 subjects of H_cohort, however, there are only 2,206 observations after deleting the subjects who have missing values.

As illustrated in the following Table 1, the outcome variable (HE) is a dummy variable with no higher education (value=0) and a pursuit of higher education, (value=1). The variable is extracted from the 2012 KEEP data (wave9). The choice of higher education includes 2-4-year junior college and 4-6-year university educations. As for H_cohort, a large number of students (86.6%) went to 2-4-year junior college or 4-6-year university, while 13.4% of students did not pursue any type of higher education. These figures are comparable with the OECD data which show that 70% of population of 25-34-year-old has completed higher education in 2016 (OECD, 2018).

Table 1. Descriptive statistics

Variables (Name)	Values/ Levels	No (2206)	%
Dependent variable			
Educational choice (HE)	0= No higher education	296	13.4
	1= Higher education	1910	86.6
Independent variables – factors of Individual and school level (4 variables)			
Gender (GENDER)	0= Male	1245	56.4
	1= Female	961	43.6
Type of high school (STYPE)	0= Vocational high school	973	44.1
	1= General high school	1233	55.9
Perceived academic ability (ABILITY)	1= Very poor	122	5.5
	2= Not good	623	28.2
	3= Modest	1160	52.6
	4= Good	283	12.8
	5=Very good	18	0.8
Expected values of job (EVJ)	0= Future job is unknown yet	708	32.1
	1= The job which meets my talent and aptitude	906	41.1
	2= The job which yields higher earnings	103	4.7
	3= The job which secures sustainable employment status	189	8.6
	4= The job which enables to develop and be creative and autonomous	187	8.5
	5= The job to serve society	28	1.3
	6= The job which gives relaxing time and pleasant environment	46	2.1
	7= The job which gives societal reputation	39	1.8
Independent variables-Socioeconomic and family background (4 variables)			
Father's education level (FAEDUL)	0= Below high school	645	29.2
	1= Vocational/ General High school	1071	48.5
	2= 2-4-year College/ University	408	18.5
	3= Graduate school or beyond	32	1.5
Father's employment status (FAWS)	0= Unemployed	129	5.8
	1= Employed with permanently or over 1-year contract	824	37.4

	2= Employed with less than 1-year contract	195	8.8
	3= Entrepreneur with employees	341	15.5
	4= Self-employed without employees	711	32.2
	5= Family worker without salary	6	0.3
Family's expected education level of child (FAMEX)	1= High school	53	2.4
	2= 2-4-year College	423	19.2
	3= 4-6-year University	1272	57.7
	4= master's degree	127	5.8
	5= Doctoral degree	331	15.0
Household income (HHIC)	Euro	2206	100

With reference to the explanatory variables, there are two groups of the variables in the analysis: one group is four variables of the individual and school levels of background and the other group includes four variables of the socioeconomic level of background All the variables except for 'household income (HHIC)' are dummy variables.

As for the variables of individual and school level, I have chosen 'gender (GENDER)' as the demographic information and 'type of high school (STYPE)' as school information. As for GENDER, male is chosen as a reference category and for STYPE, vocational high school is selected as a refence category. Furthermore, 'perceived scholastic ability in general (ABILITY)' is also included as the individual characteristic. In case of ABILITY, this variable is subjective figures rather than objective as there was such no overall grade available in the dataset. Nevertheless, ABILITY is normally distributed (mean: 2.74, Sd:0.78). For ABILITY, moderate level of perceived scholastic ability has been chosen as a reference category since this category is the largest.

The variable of 'expected returns or values to future job (EVJ)' is to show the individuals' expected return or value of the job if they have a specific job for the future. There is no question in relation to the monetary and non-monetary returns to education in the panel survey. Thus, one of the questions from which we can estimate the expected returns is chosen as the alternative.

The question is about expected values of future job including monetary and non-monetary gains from future occupation. Even though it is not about expected returns to education, this variable is likely to be meaningful for observing what kind of expectations toward future job individuals have. EVJ is a proxy variable of the expected returns to education. There are nine statements regarding EVJ in the survey question, however I combined two similar statements in one group, therefore there are total eight categories of "future job is unknown yet", "the job which yields higher earnings", "the job to serve society", and five more. The biggest share (41.1%) agreed on the statement of 'the job which meets my talent and aptitude' as the most important value of job, while very small number of individuals (4.7%) agreed on the statement regarding higher income as the most important value of the future job. In effect, the second biggest share (32.1%) was the group that who do not know what kind of job to have in the future. In order to explore the expected value of job among the group having any idea of future occupation, the other group having no idea of future job has been chosen as a reference category.

The other group of explanatory variables used in the models is the socioeconomic factors made up of four variables. 'Father's educational level (FAEDUL)' is one of the socioeconomic factors. Mother's education level was considered at first, though both parents' education levels are likely to be highly correlated especially in the context of South Korea. Therefore, only father's education level is selected. As the reference category, the biggest group, 'high school graduate' is adopted. Furthermore, father's employment status (FAWS) is also taken into account since father plays a central role of breadwinner in most cases. For FAWS, the largest group "employed with either permanent or over 1-year contract" is selected as a reference. In addition to the social background described above, household income (HHIC) is employed as the economic factor. Considering fathers who did not make any income, household income is utilized instead of father's income. Despite highly right-skewed distribution of HHIC, log transformation is not in use[15]. HHIC in the Korean currency (Won) is converted to the European currency (Euro). According to the descriptive statistics of HHIC, mean value is 2,186 € with standard deviation of 1,380 €. In addition, it is given that minimum value is 0 € and maximum value is 15,200 €.

[15] There has been a technical issue arising from the use of logarithmic transformation in the logistic regressions. Although further evidences are required, but it is assumed that no use of log transformation does not violate the assumptions of logistic regression.

Finally, there is one more variable 'family's expected level of education of child (FAMEX)' which allows use to see family's influence on the student's educational decision-making. It is shown that about 58% of households expected a child to go to university, while only 2.4% of households expected only level of high school. As a reference category, I have chosen the university education, which is the biggest share of the variable FAMEX.

6.3.2 Variables of returns to education

As demonstrated previously, the first analysis with the logistic regressions is to estimate probabilities of choice of higher education with eight independent variables. As the following step, it becomes interesting to explore the actual returns to education eight years after high school among the same individuals. Since the KEEP offers the longitudinal datasets, it is available to examine the past status as well as the present status of the subjects.

As shown in the following table 2, variables in relation to the monetary and non-monetary returns to education are described in detail. These variables include the observations of H_cohort, M_cohort and C_male (N=5,134). During the analysis, I removed seven outliers who are indicated with far higher earnings between 7,000€ and 22,800 € in the dataset despite the interesting characteristics of outliers[16]. To briefly introduce the variables regarding the returns to education, the variable 'current employment status (STATUS)' is employed as the occupational returns. In terms of monetary returns, 'monthly income (WAGE)' is adopted and the Korean currency has been converted to the Euro. Moreover, the variable 'level of job satisfaction (SAT)' is selected as for non-monetary returns to education in the analysis.

With respect to STATUS, there are six categories: 'unemployed', 'family worker without salary', 'full-time student', 'part-time working student', 'employed' and 'self-employed'. It is categorized as ordered based on the earning levels of occupation. Therefore, unemployed, family worker without salary and full-time student are recoded as 0, 1 and 2 and part-time working student, employed and self-employed are recoded as 3, 4 and 5 respectively. The biggest category

[16] The seven outliers were males, graduates of higher education and self-employed.

is employed (58.7%). The second biggest category is shown as unemployed (15.7%) and the third biggest category is full-time students (13.4%).

Table 2. Descriptive table of monetary and non-monetary returns to education

Variables	Values/ Levels	No	%	Mean	SD
Educational attainment level (E_LEVEL)		5134	100	5.5	1.91
	1= Below high school	15	0.3		
	2= High school graduate	631	12		
	3= Dropout of junior college or university	280	5		
	4= Junior college student	202	4		
	5= University student	706	14		
	6= Junior college graduate	1358	26		
	7= University graduate	1634	32		
	8= Dropout of graduate school	14	0.3		
	9= Graduate student	223	4		
	10= Master's or doctoral degree	71	1		
Employment status (STATUS)		5134	100	3.03	1.51
	0= Unemployed	809	16		
	1= Family worker without salary	27	0.5		
	2= Full-time student	690	13		
	3= Part-time student	439	9		
	4= Employed	3014	59		
	5= Self-employed	155	3		
Monthly income (WAGE)	In Euro	4695	100	914.1	791.63
Level of job satisfaction (SAT)		5138	100	2.38	1.68
	0= Unemployed or full-time student	1506	29		
	1= Very unsatisfactory	71	1		
	2= Unsatisfactory	321	6		
	3= Moderate	1680	33		
	4= Satisfactory	1327	26		
	5= Very satisfactory	233	5		

In terms of WAGE as the variable of monetary returns, it is indicated that a mean of WAGE is 914€ (SD: 792€). Finally, SAT as the non-monetary returns has five-scale responses from 1 (very unsatisfying) to 5 (very satisfying). In case of unemployed and full-time students, they are recoded as value 0 due to their 'no work' status. An average of job satisfaction level is 2.38 (SD:1.68).

In order to examine correlation between the actual returns to education and 'current level of education (E_LEVEL)', I have categorized and coded E_LEVEL as follows: below high school as 1, high school graduate as 2, dropout from junior college or university as 3, junior college student as 4, university student as 5, junior college graduate as 6, university graduate as 7, dropouts of graduate school or doctoral school as 8, graduate student as 9, and finally Master's degree or Ph. D as 10. The biggest group appears to be 'university graduates' comprising of 32%, followed by 'Junior college graduates' of 26%. In contrast, the groups of 'below high school' and 'high school graduates' are made up of only 0.3% and 12% each. In this vein, it is shown that 88% of the subjects have higher education either in junior college or university and they are the ones to be called as higher education graduates.

7. Results and discussion

The results of the empirical analyses are divided into the two parts. The first part is to show and describe the estimates of probability of choice of higher education derived from the binomial logistic regression models. The predictors of individual, school and family levels are taken into account to estimate the likelihoods of choice of higher education. The second part subsequently elaborates the actual monetary and non-monetary returns to education of the subjects eight years after high school and examines the relationships between demographic, educational and occupational aspects and the actual returns to education, more specifically, monthly income and job satisfaction.

7.1Estimated probabilities of choice of higher education

$$P(Y_i = 1|e_i, s_i, x_i) = \frac{\exp(\alpha+\beta 1 e_i+\beta 2 s_i+ \beta 3 x_i)}{1+ \exp(\alpha+\beta 1 e_i+\beta 2 s_i+ \beta 3 x_i)},$$

In this model, the dependent variable is a binary outcome variable in terms of higher education, either having no higher education (coded as 0) or having higher education from junior college and university education (coded as 1). As seen above, the equation of a binomial logistic model is a function of likelihoods of choice of higher education of individual $_i$ on three predictor groups of e_i as the expected returns or values of job, s_i as the socioeconomic predictors particularly family background, and x_i as the individual and school level predictors. In the equation, α represents the intercept in the model, and β_1, β_2 and β_3 indicate the logs of odds of the predictor groups (e_i, s_i and x_i). Thus, exponential β_1, β_2 and β_3 are expressed as the odds ratios of predictors group of e_i, s_i and x_i respectively, which is to indicate the relative likelihoods of higher education.

The followings are more details in terms of predictors of each group. The group e_i has only one dummy variable of 'expected return or value of future job (EVJ)". The group of s_i. includes the socioeconomic predictors, i.e. 'father's educational level (FAEDUL)', 'father's status of employment (FAWS)', 'family's expectant educational level of child (FAMEX)' as well as 'household monthly income (HHIC)'. The last group of x_i has the variables of individual and school characteristics i.e. 'gender (GENDER)', 'type of high school (STYPE)' and 'perceived scholastic ability (ABILITY)'.

The logistic function above is originally derived from the model of total expected utility of Jæger (2007), which is introduced in the section of the empirical model. For the empirical analysis in this paper, I have slightly changed his empirical model to fit available information of the KEEP data in the modified models. There are mainly two differences between his models and my models. First, his model has three options as the outcome while I have a binary outcome variable. Second, instead of having two separate variables of expected monetary and non-monetary (sociological) returns to education, I have employed a proxy variable called 'expected returns or values of future job (EVJ)", which contains not only expectant monetary but also expectant non-monetary returns

to future occupation as dummies. Although EVJ was not designed to directly capture the expected returns to education, the variable is likely to reveal information in relation to expectation and beliefs toward future, which may be related with choice of higher education.

In order to examine correlations between variables, I have conducted tests of Spearman's rank correlation (rho). A correlation coefficient between FAEDUL and FAMEX is likely to be the highest with 0.35 (p-value:<0.001) followed by HE and FAMEX with 0.3 (p-value <0.001). Other correlations appear to be correlated very weakly according to the results with low (ρ)s. For instance, a correlation between STYPE and ABILITY indicates only 0.03 (p-value: <0.001) and a correlation between HHIC and ABILTY is 0.08 (p-value: <0.001).

All predictors are run by univariate logistic regressions in the first stage of fitting models. Given the results of univariate regressions, all eight predictors appear to be statistically significant, for example, STYPE, FAMEX and HHIC are very significant with p-values (<0.001). GENDER (0.03), ABILITY (<0.001 to 0.97), EVJ (<0.001 to 0.17), FAWS (<0.001 to 0.6) and FAEDUL (<0.001 to 0.02) have slight lower significance levels albeit with varying coefficients between categories.

In order to obtain the best model for which it is able to estimate and predict the likelihoods of choice of higher education, the backward stepwise selection method is applied. With this method, insignificant variables are removed one by one from the full model (see the output of the models in Appendix II). In the full model with all eight independent variables, STYPE, FAMEX and HHIC appear as very significant predictors being consistent with the results from the univariate models (p-values < 0.001). ABILITY and FAEDUL also transpire to be consistent with the results of univariate models. However, a big change is found in the variable FAWS as it has become insignificant in the full model with p-values (0.6 - 0.99). GENDER and EVJ are also shown to be much less significant in the full model relative to the univariate models. FAWS becomes very insignificant in all categories in the full model, thereby FAWS has consequently been chosen as the first variable to be removed in the second model.

With respect to the coefficients in the full model, GENDER seems to have a negative association with choice of higher education (estimate: -0.14, OR: 0.9), however GENDER is too insignificant to take as a good predictor. In terms of STYPE, which is statistically very significant (p-value: <0.001), general high school students apparently have almost 5 times more likely to choose higher education relative to vocational high school students (estimate: 1.59***, OR: 4,88). Turning to the 'perceived scholastic ability (ABILITY)', it is so apparent that a very lower level of ABILITY is likely to be associated negatively with a pursuit of higher education (estimate: -0.98***, OR: 0.37). If a student has very low level of scholastic ability, then a probability of higher education is likely to decrease by 63%, compared to a student with the modest level of ability. HHIC has constantly been a very significant predictor in the univariate and full models, but interestingly, the probability of higher education by one unit increase in household income does not change the probability of choice of higher education (estimate: 0.0 ***, OR: 1). In other words, there is no effect of economic background on the individual's choice of higher education. It is believed that this result partly explains how higher education in South Korea has expanded. Irrespective of level of household income, students by and large make the choice of higher education.

The predictor 'family's expectant level of education of child (FAMEX)' seems to explain further the effects of social background on the higher educational decision-making. As noticed previously, approximately 98% of the households expect their children to pursue higher education. For the households expecting only high school education, the likelihood of higher education is likely to decrease by 85% relative to the households expecting university education. In addition, for the households expecting education of junior college, the likelihood is also likely to decrease by 45% compared to the same reference.

Another predictor for the family background, the father's education level (FAEDUL) shows that a father who is highly educated affects the student's decision-making of higher education. According to the results, a student with a father with a degree higher education has almost a triple probability of choice of higher education (estimate: 1.00***, OR: 2.72) compared to a student having a father with only high school degree. Furthermore, in terms of 'father's work status (FAWS)', only 'employed with less than one-year contract' and 'self-employed without employees' relative to 'employed with longer contract' have a positive association with the choice

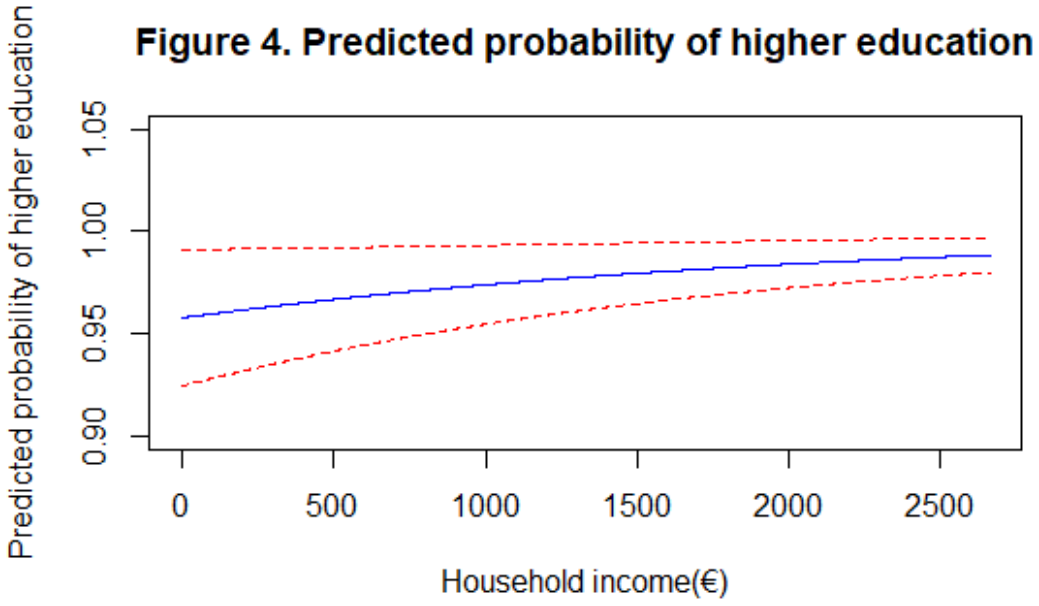
of higher education. However, it is consistently appeared that p-values of FAWS are too high to include in the subsequent models.

Finally, all categories in the variable 'expected value of future job (EVJ)' has appeared to be insignificant in the full model. Once again, EVJ has consistently been insignificant predictor, therefore any interpretation is not necessary. By this account, it should be said that it is not available to find any association between expected value of future job and choice of higher education. Nevertheless, an interesting issue to further examine is the relation between students' the most value of future job and the choice of higher education. The subjects who regarded higher earnings as the most valuable are negatively correlated with the choice of higher education, whilst dedication to society as the most important value of future job seems to be positively correlated with the choice of higher education. The first full model has been examined by the goodness of fit tests, showing that the model has AIC (1359.1) and McFadden's pseudo R^2 (0.25).

The second model is subsequently followed by removing the variable FAWS which is the most insignificant variable. The second model's coefficients are not changed much, therefore it is confirmed that FAWS does not have any interaction with other predictor variables. STYPE, HHIC and FAMEX are quite significant and FAEDUL is also consistent with a category of 'fathers as graduates of higher education' which is significant (p-value: <0.01). The predictor, EVJ is also constantly insignificant in the second model. According to goodness of fit tests, the second model becomes better with 1349.70 as AIC and with pseudo R^2 of 0.25.

In the third model, significant five predictors are remained for further model fitting after removing GENDER and EVJ which are insignificant. Coefficients of the third model have not changed much and significance levels have been maintained. In the goodness of fits tests, the third model has the lowest AIC (1344.8) and pseudo R^2 (0.24). Likelihood ratio tests show the results that the last two models are not significant (p-values of 0.99 for the second and 0.24 for the third model) compared to the full model. Therefore, the null hypothesis that models with less predictors fit better is not rejected. In effect, the third model has the best results of goodness of fit among other smaller and bigger models. Therefore, the third model is confirmed as the best model to estimate and predict the probability of higher education.

In the final model, the five predictors of STYPE, ABILITY, HHIC, FAEDUL and FAMEX appear to be the significant predictors. In light with STYPE, general high school students are about five times more likely to pursue higher education compared to vocational high school students. In case of the predictor ABILITY, the category of 'very poor' has 73% less likely to go to college or university relative to the students with modest academic ability. An estimation of HHIC tells us that the probability of higher education with one unit increase in household income, is almost same as the probability with no increase in household income. This implies that economic condition is significant but no impact on choice of higher education. In terms of FAEDUL, it is appeared that a student with a father who has degree of higher education is three times more likely to pursue higher education. The final predictor of the model is FAMEX which signify that if family's expected education level of a child is lower than university education, the probability of higher education is likely to decrease by 46%-86%.



With the final model, I predict a probability of higher education of an individual with the following conditions: a general high school student with not good academic ability, a father as a high school graduate, 2186€ as household income (middle class) and university level as the family's expectation. For the individual with those conditions, a predicted probability of higher education is 98.5%. The Figure 4, a prediction curve (blue line) indicates that an individual with the same conditions is predicted to have a probability of higher education depending on household

income within 95% of confidence interval curves (red dotted lines). According to the predicted estimation, the individual with same conditions albeit with zero household income has more than 95% probability of higher education. In recognition of this striking prediction results, the Koreans seem to be by and large willing to pursue higher education if they are accessible to higher education. In other words, a student, who can be admitted from higher education institutions will take higher education irrespective of the family's economic status.

In terms of the socioeconomic factors, father's education level and household income appear to be the ones influencing the educational decision-making, which is consistent with the empirical results from the literature of sociological rational choice. In addition, FAMEX indicating family's expected education level is also found as one of the significant factors. In this regard, it can be said that parents and family play a crucial role in the student's choice of higher education. The impact of family's expectation on the student's educational choice is likely to be understood in line with the maintenance of social mobility or upward social mobility.

More interestingly, Household income appears to be very statistically significant, but it can be interpreted that even a lower level of economic background cannot be an obstacle for a choice of higher education. This is particularly debatable issue in comparison with the existing assumptions that socioeconomic factors are significantly impactful in the educational decision-making. Given that higher education in South Korea has substantially been relying on private funding, i.e. tuition fees from students and household and tuition fees has soared in the mid-2000s, this result is astounding. The implicit presumption is that there might be a way of financial supports such as study loans which are easily available for the individuals and households to whom education costs are burdensome. Nevertheless, this result is necessary to be followed up by further investigation.

After all, inequality due to economic background might not be significant in the context of South Korea, rather other social factors such father's education level and scholastic ability seem to be influential determinants in a pursuit of higher education. The significant no effect of the economic

background on the educational decision-making seems to reflect how Korean society has been triggered to expand higher education massively.

To sum up with the results from the logistic regression analysis, the results particularly in terms of social background support that the social background indeed affects the decision-making regarding higher education (e.g. Breen and Goldthorpe, 1997; Becker, 2003). Most of the socioeconomic background i.e. father's education and family's educational expectation of a child seem to be very influential in the decision-making of higher education although the economic background is not likely to be any barrier in the choice of higher education. In case of EVJ, the variable employed to explore the impact of value of future job on the choice of higher education has been consistently insignificant in all models. Therefore, the estimation of choice of higher education based on the expected returns to future job is not applicable. Since the hypothesis 2 is not able to be tested due to insignificance of the variable, it is not available to evaluate that the expected monetary returns are more important determinants than non-monetary returns to education.

7.2Actual returns to education

In the previous analysis, the impacts of individual, school and socioeconomic factors as well as expectation on choice of higher education are investigated. Up to this point, it is known that there are significant factors of FAEDUL, FAMEX, HHIC and STYPE affecting the educational decision-making of the individuals. In the following analysis, I shift my attention to the relationships between the education level and the occupational and socioeconomic status by examining to what extent educational level is associated with the actual returns to education, particularly, the actual monetary and non-monetary returns. An exploration of the actual returns by education level, status of employment, gender and cohort is the primary goal in the second analysis, in search for the expected value of higher education. As for examination of the actual occupational return, 'status of employment (STATUS)' is employed and I also have selected

‘monthly earnings (WAGE)’ as monetary return and ‘level of job satisfaction (SAT)’ as non-monetary return.

For this analysis, I have initially attempted to find out the relation of causality by fitting linear regression. As for dependent variables, earnings and level of job satisfaction are concerned and all independent variables used in logistic regressions and variables of current educational level, occupational status and cohorts are taken into consideration. In the OLS models, variables of individual level and socioeconomic level as well as occupational level are employed. However, it is appeared in the residual analysis that OLS models do not meet the underlying assumption of linear regression as the models have unbiased and homoscedastic distribution of residuals. In addition, statistical significance (p-values) in the linear regression models seem to be quite high except for gender and current educational level. It is supposed that actual returns to education would be explained more variables such as occupation and career related variables as well as education-related variables. Indeed, in this analysis, type of work place, contract type of employment, occupational experience, internship, field of study and school effect and other interesting variables are excluded. Notwithstanding, there is a clear intention to observe the direct effects of educational level on the returns to education by excluding those variables. In the inspection of wage and job satisfaction, it is presumed that education level could play a role of confounder. By all these presumed issues, the OLS models consequently could not be fitted. As a consequence, the actual returns to education have been analyzed primarily with t-tests as well as other descriptive statistics in order to test the remaining three hypotheses in the following.

According to t-tests between WAGE and SAT by GENDER, COHORT and E_LEVEL, the null hypotheses are rejected as mean values of GENDER- male and female and COHORT- H_cohort, M_cohort and C_male and different educational levels (E_LEVEL) appear to be not same. It is unsurprisingly to observe that STATUS, WAGE and SAT have strong correlations each other according to Spearman’s rho estimates (0.72 - 0.78). And the level of education appears to be positively correlated with STATUS, WAGE and SAT (0.11, 0.14, 0.09) with p-values smaller than 0.001. As for the findings with respect to monetary and non-monetary returns to education, the analysis focus on the comparisons of individual returns by education level and gender and cohort.

7.2.1 Occupational returns to education

Occupation returns to education refer to the gain of occupational status from the education level. In this section, occupational returns are the status of employment, more specifically, proportions of employment and unemployment and types of employment are primarily focused. Furthermore, the comparisons of gender and cohort are taken into consideration in order to explore the effects of gender and time.

First, the occupational returns by education level are explored. For a comparative analysis, only H_cohort and M_cohort are employed. Furthermore, the subjects who were students at that time of survey are excluded in this analysis. For those as high school graduates and dropouts from higher education (N=908), a share of employed, self-employed or family worker was nearly 75% while a share of unemployed was 25%. For the group of graduates of junior college (N=1147), about 81% were either employed, self-employed or family worker, and 19% of them were unemployed. For the university graduates including dropouts from graduate school (N=1289), 76.6% were either employed, self-employed or family workers but 23% were recorded as unemployed. In case of the observations belong to the category of the master's or doctoral degrees (N=35), 28 subjects (80%) were employed or self-employed and the remaining 7 subjects (20%) were unemployed.

With respect to the occupational status by cohort, 58% of H_cohort (N=2,447) were employed, self-employed or family workers, 26% of them were full-time or part-time working students, while 16% were unemployed. For the youngest M_cohort (N=1974), 62% of them were either employed, self-employed or family worker, 20% were full-time or part-time working students. In addition, a share of unemployment was 18%. Accordingly, M_cohort is likely to be slightly better in terms of status of employment, but the share of students is higher in M_cohort than in H_cohort.

As for a comparative analysis of the occupational returns by gender, the female of H_cohort (N=1061) and C_male (N=718) are compared. It is found that 68% of female of H_cohort were either employed, self -employed or family worker and slightly more than 20% were unemployed Furthermore, only 12% of them were full-time or part-time working student. For the male cohort

(N=715), almost 79% were either employed or self-employed and only 6% among them were unemployed while 15% were full-time or part-time working students. Accordingly, it is noticeable that unemployment rate is higher among female group than among male group.

It is apparent to see that males had a far better employment status as the unemployment share of female (20%) was more than 3 times that of male (6%). In more detail, the share of employment/ unemployment of female and male by the education level has been explored. In case of the university graduates, the group of females with the university education (N=499) had 72% of employment including self-employment and family worker and, approximately 28% of them were unemployed. In contrast, it is shown for the group of males with the university education (N=783) that a share of employment was close to 80% (20% of unemployment). Accordingly, what is presumed is that there are inevitably different effects of education on the status of employment by gender. Education effects are likely to be stronger among males than females.

More importantly, it is available to find out the relationship between the educational level and unemployment rate. It is shown that the biggest share of unemployed is among the group of high school graduates with 25% and the smallest share of unemployed is shown as the group of junior school graduates with 19%. In case of graduates of college/university and graduate schools, they appeared to have 23% and 20% of unemployment respectively. All in all, a degree of higher education per se seems to help employment in general, however there tends to be a distinctive difference of educational impact by gender.

7.2.2 Monetary returns to education

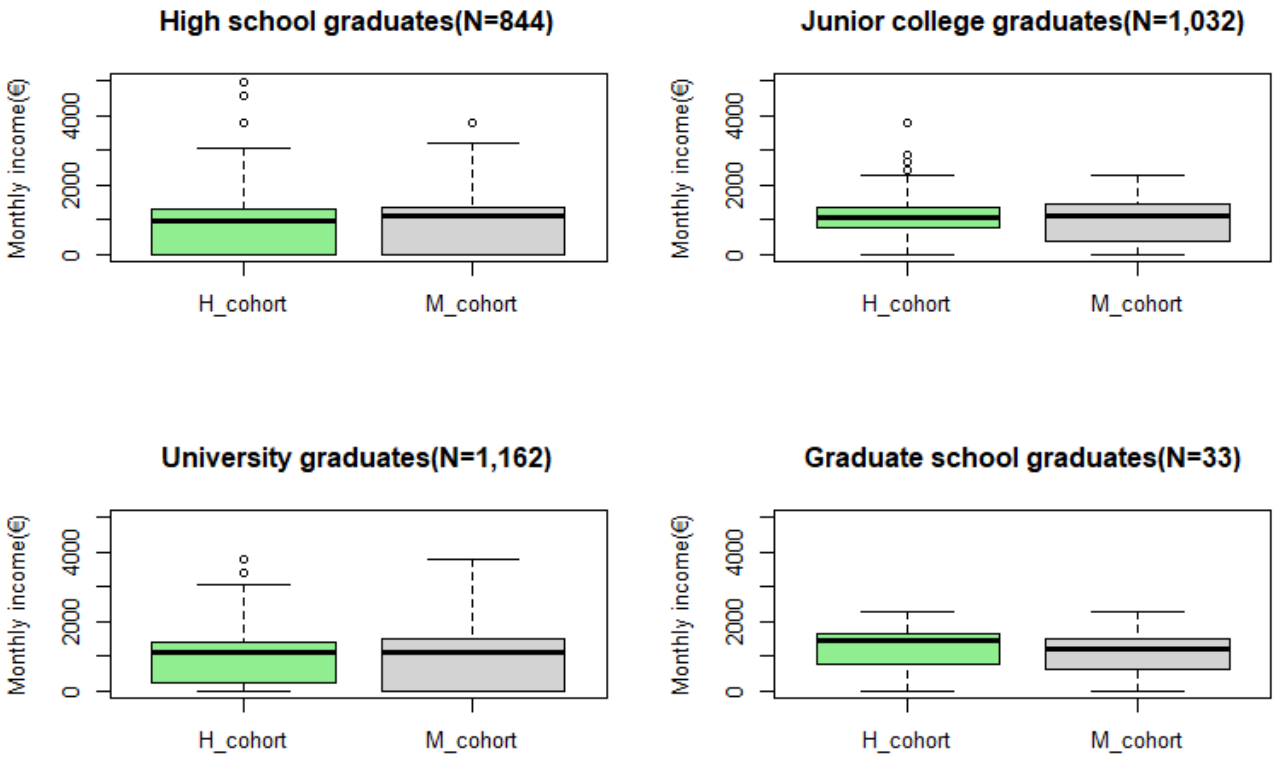
The monetary returns to education have drawn substantial attentions by scholars and researchers in the fields of economics and sociology of education as the monetary returns appear to be a visible tool in observation of the effects of education. In this analysis, being consistent with literature of rational choice, human capital and sociological rational choice, monthly income is employed as a means of monetary returns to education. After the comparisons of monthly income by education level, I further elaborate the monetary returns by gender and cohort among the subjects who have the same level of education.

First, the examinations of means of monthly income by educational level have taken place. For this analysis, the observations of H_cohort and M_cohort (N=4,427) were examined. In addition, the Welch two sample t-test shows that means of incomes by education level are not same with its statistical significance (p-value: <0.001). The groups of high school graduates and dropouts of higher education (N=843) have 943.2 € as a mean of income (SD:798.4 €). Another group of observations, for example, the graduates of junior college (N=1032) has 976.7 € as a mean of income (SD: 629.9 €). As for the university graduates (N=1162), it is found that a mean of income of the group is 1,018.6 € (SD: 750.2 €). Lastly, the group of the master's or doctoral degree (N=35) has average income of 1,137€ (SD: 736.6 €).

Up to this point, it is shown that there are clearly positive effects of education on earnings. The higher the level of education the individual has, the more earnings are gained. This result supports the prominent hypothesis of human capital as earnings differential between lower level of education and higher level of education exists. Thus, hypothesis 3 is not rejected. In this vein, my implicit assumption is that individuals who are supposed to face the moment of decision-making in terms of higher education, will formulate their expected value of higher education by acknowledging from the actual returns to education of the precedent decision-makers (Manski, 1993). Based on the acknowledgement of the expected values, individuals will deem that the expected monetary returns to higher education are higher than those to lower levels of education.

Secondly, our attention needs to be shifted to the study of means of income by cohort among the subjects who have same levels of education (see Figure 5). This examination seems to be important to figure out as to whether monetary returns to education has been decreasing over time by comparing earnings differential between H_cohort and M_cohort. However, it should be noticed that time difference between H_cohort and M_cohort is only 3 years, which may be too short to observe a change of level of earnings by education level.

Figure 5. Boxplots of monthly income by education level and cohort



According to the results of comparision, the earnings of M_cohort were higher than those of H_cohort across almost all education levels except for the group of the master's and doctoral degree. For example, the high school graduates and dropouts of higher education of H_cohort (N=486) have average income of 898.7 € (SD: 781 €) while those of the M_cohort (N=357) have 1,004.4 € (SD: 808.9 €). Means of income among the groups of junior college and university graduates are also higher in M_cohort than in H_cohort. More specifically, a mean of income among junior college graduates is 974.95 € (SD: 625.4 €) of H_cohort (N=582), 979 € (SD:636.4

€) of M_cohort (N=450) respectively. As for university graduates, average income of H_cohort (N=592) is 992.7 €, while average income among university graduates of M_cohort (N=570) is 1,045.5 € (SD: 782.4 €). The master's and doctoral degree groups have such a reverse tendency in this regard, as the M_cohort (N=20) had slightly lower average income (1,105 €) than H_cohort (N=13) with 1,186.2 €. However, it is assumed that it might be restricted to interpret the result as the number of observation is too small. Interestingly, there is an exceptional observation in respect to a mean income among two groups of education level. What is shown that the average income of high school graduates (1,004.4 €) slightly surpasses that of junior college graduates (979 €) among M_cohort. The earnings tend to grow over time, however it would happen due to inflation.

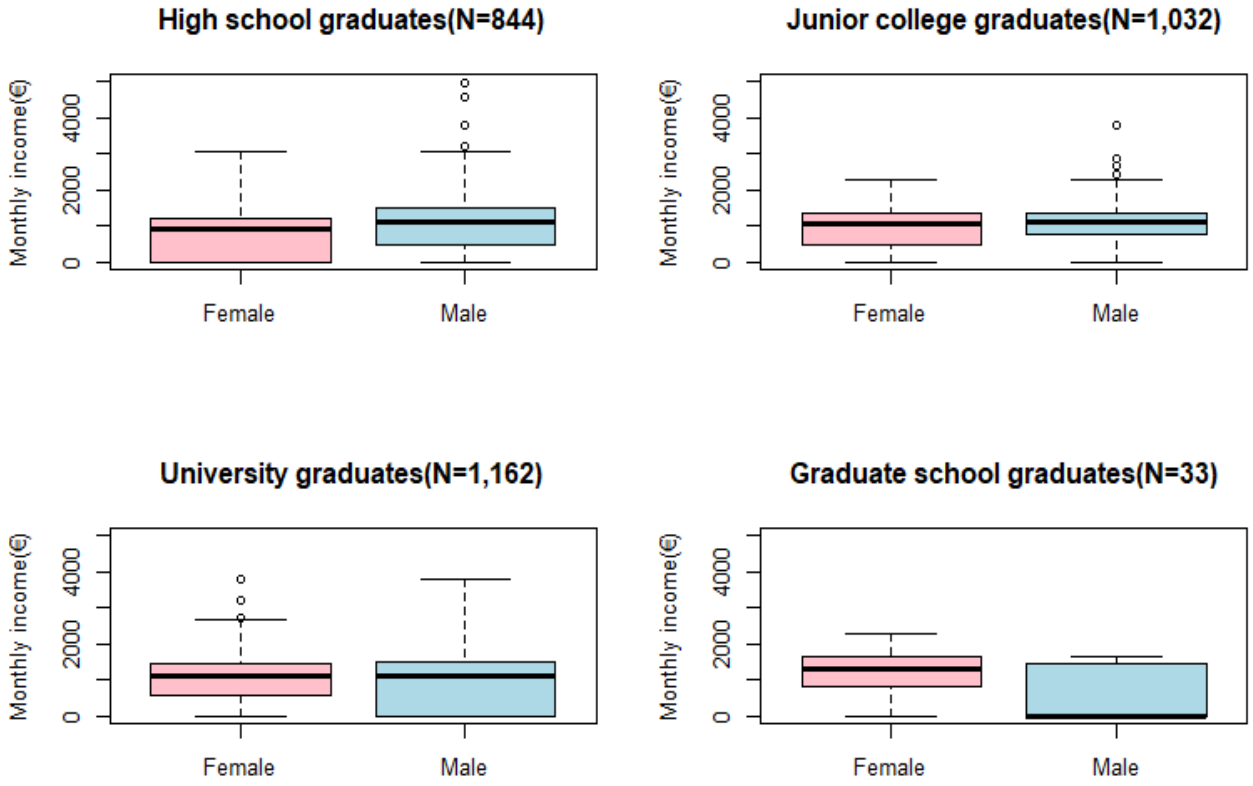
In addition, given that the tuition fee of higher education between the mid- 2000s and 2010 has exponentially grown in South Korea, it is of interest to examine the rates of monetary returns to university education. Considering the tuition fees in rapid growth given time, it is presumed that average higher education costs of M_cohort would be more than the ones of H_cohort. If earnings differential between two cohort is not changed, the rates of monetary returns to higher education would be getting lower among M_cohort due to the soared costs of higher education. However, as it is shown previously, the average earnings of M_cohort is slightly more than those of H_cohort along with increases in education costs. In this vein, the additional education costs paid by the M_cohort compared to H_cohort would be canceled out by more earnings of M_cohort relative to those of H_cohort. Notwithstanding, it is not available to measure the rates of monetary returns[17] to higher education with given information. More importantly, this interpretation could be very limited time difference is only three years between 2009 and 2012. With relatively short time difference between the two cohort, either differences of average income or changes of rates of monetary returns to education might be not significant. Thus, it will be necessary to further examine any change in the long run especially with different cohorts with a bigger gap. Moreover, data contains education costs should be examined carefully as the education costs vary a lot.

A comparative analysis of the monetary returns to education by gender is subsequently conducted. Among the male group with high school degree (N=473), a mean of income is 1,085.9 € (SD:

[17] Due to the lack of data in this analysis, the rates of returns to higher education is not measured.

876.2 €). In contrast, the female group of high school degree (N=390) had much lower average income, 761.3 € (SD: 642.9 €). In other words, male subjects with high school degree are far better off than the female group with the same level of education. As for the graduates of junior college, males' mean of income (N=485) is 1,024.8 € (SD:622.7 €) whilst female (N=547)'s is 934.1 € (SD: 633.8 €). For the groups of the university education, the male group had 1,024.6 € (SD: 858.5 €) while the female group (N=701) had 1,014.6 € as the average income (SD: 670.2 €). It is apparently seen that monetary returns to education of females were lower than those of males. The figure 6 clearly shows that males earned more than females even with the same level of education.

Figure 6. Boxplots of monthly income by education level and gender



However, there is a different observation among the groups of master's and doctoral level. According to the statistics, the female group (N=28) with the highest level of education has much more earnings compared to the male group (N=5) as females' average income is 1,228.2 € (SD:

690.2 €) whilst males' average income is 626.2 € (SD: 860.8 €). However, a number of subjects at the highest education level are too small to interpret them as significant.

Notwithstanding, it is observed in general that male groups seemed to earn more than females albeit with the same level of education. This is consistent with the results of empirical studies (e.g. Sandefur & Park, 2007) that females tend to have relatively lower returns to education compared to males. This result confirms that the educational effects on earnings are likely to be stronger among male groups than female groups. Nonetheless, it is shown that the higher level of education narrows the earnings differential between gender. Substantial decreases in the earnings differential by gender are shown as the education level goes up. The earnings differential between females and males was 324,6€ for the high school graduates and dropouts, 90,7€ for the junior college graduates and only 10€ for the university graduates. In this vein, investment in higher education of females seems to result in smaller earnings differential between females and males, thus females would regard higher education as an apparatus which narrows earnings gap between gender.

All in all, these results regarding the monetary returns to education support hypothesis 3 that monetary returns to education are higher among the individuals with a higher level of education compared to those with a lower level of education. By this account, the individuals who are concerned with choice of higher education would learn the actual monetary returns of the precedent decision-makers so that they can develop the preference consisting of the expected monetary returns to higher education in the educational decision-making.

7.2.3 Non-monetary returns to education

Aside from the monetary returns, non-monetary returns have been drawing further attentions by the scholars and researchers as social and non-monetary returns also have known important. As a means of non-monetary returns to education, level of job satisfaction has been employed. It is perceived that job satisfaction is subjective perception toward job though it is also the most related variable as non-monetary returns in the panel data. In this analysis, I pay particular attention to examine as to whether level of job satisfaction goes up by increase of education level. The job satisfaction level is evaluated by the five levels of Likert scale from 1 (very unsatisfactory), 2 (unsatisfactory), 3 (moderate), 4 (satisfactory) to 5 (very satisfactory).

To observe the degree of job satisfaction by education level, unemployed and students are excluded in the dataset. Thus, job satisfaction is only evaluated for the employed, self-employed and family workers. The group of high school graduates and dropouts of higher education (N=908) has the lowest level of job satisfaction (mean: 2.48, SD:1.59), while junior college graduates (N=1145) have 2.69 (SD:1.49) and university graduates (N=1281) have 2.6 (SD: 1.6). Furthermore, the group of master's and doctoral degrees has the highest level of job satisfaction (mean: 2.86, SD: 1.67). In accordance with these results, it is presumed that the groups having a higher level of education seem to have higher levels of job satisfaction relative to those having lower education level. This is consistent in line with positive educational effects on monetary returns. In this regard, hypothesis 4 stating that non-monetary returns to education are higher among the individuals with a higher level of education relative to those with a lower level of education is not rejected.

For the extra information, I have examined the levels of job satisfaction by cohort within the group of the same level of education. In general, M_cohort seems to have a lower level of job satisfaction in general. Except for the high school graduates (N=394) of M_cohort with slightly higher average level of job satisfaction than H_cohort (N=514) by 0.16, M_cohort's average levels of job satisfaction appear to be slightly lower than the other educational levels of H_cohort. With these results, it is assumed that M_cohort, on the one hand, had a higher average income

relative to H_cohort, on the other hand, M_cohort appeared to be less satisfactory with their jobs relative to H_cohort.

Furthermore, the examination of job satisfaction by gender with the same level of education reveals that males from the groups of high school and junior college graduates have higher levels of job satisfaction (2.7, 2.8) compared to female counterparts (2.2, 2.6). On contrary, the female group of university graduates has shown a slightly higher level of job satisfaction (2.7) relative to the male group (2.5). Similarly, the group of master's and doctoral degree shows that females (N=30) had the highest average level of job satisfaction (3.1) while male counterpart (N=5) had the lowest average level of job satisfaction (1.4). These results can be somehow interpreted this way that in terms of job satisfaction, females are likely to increase the level of job satisfaction by the increase in the educational level.

8. Conclusion

Throughout the paper, it has been endeavored to shed light on the choice of higher education and thus the expansion of higher education by exploring the individuals' behavior of educational decision-making in the context of South Korea. It has been known that South Korea has undergone such a rapid expansion of higher education from the 1980s onwards along with industrialization and economic growth. Currently, approximately 70 per cent of 25-34 aged population have higher education degrees, which is shown as the largest population ratio with higher education among the OECD nations. Such that, it seems to draw keen attention as to why people go to junior college or university with considerable education costs.

This study has been constructed on the grounds of the theoretical framework on rationality in the field of economics and sociology of education. According to rational choice theory, individuals' decision-making on education is based on the intrinsic calculation of benefits and costs. In other words, the individuals estimate the expected values of the options available. This kind of behavior is basically to maximize the utility by making the optimal choice within given resources. In a similar vein, human capital theory describes that investment in human capital by a means of education would be decided by the comparison of the expected values. More specifically, it is a decision-making based on expected returns to education. It is also outlined that investment in human capital would yield higher productivity and higher earnings in turn. Moreover, the literature of sociological rationality elaborates that not only individual level of factors such as academic aptitude or ability, but also socioeconomic level of factors, for example, parents' education level and family's economic condition are shown as the integral determinants in the educational decision-making. Furthermore, the total expected utility model suggests that educational choice is contingent on the expected value of education comprising not only expected monetary returns but also non-monetary or social returns (Jæger, 2007).

Accordingly, hypotheses have been set up for testing with statistical analyses by exploiting the 'Korean Education and Employment Panel data (KEEP)'. The KEEP is the longitudinal datasets of the two cohorts, middle school students (M_cohort) and high school students (H_cohort) from 2004

(wave 1) and additionally college/university male students (C_male) as the male group corresponding to female H_cohort from 2010 (wave 7).

In order for hypotheses testing, the two empirical analyses are conducted. The first analysis is to estimate the likelihoods of choice of higher education influenced by the individual, school and socioeconomic levels of predictors. Thereby, binomial logistic models have been constructed. In the analysis of the estimation, it has been anticipated to find out to what extent individual and family levels of determinants influence the behavior of educational decision-making. More importantly, it has been attempted to investigate the expected value of higher education regarding whether monetary returns to education is more important than non-monetary returns to education. Furthermore, it has been attempted to investigate the impact of the individuals' expected value of future job on the educational choice. The second analysis has been subsequently conducted in order to examine the actual returns to education with particular attention to occupational, monetary and non-monetary returns to education among the subjects. Therefore, it has been intended to explore expected returns to education learning from the precedent educational decisions in furtherance of total expected utility.

With respect to the results of the first analysis, it is evidently shown that most of predictors are consistent with the empirical results of sociological rationality framework. It is indicated that individual, school and social level of predictors i.e. 'type of high school', 'scholastic ability' and 'father's education level' and 'family's educational expectation toward a child' appear to be significant determinants together with the economic factor of 'household income'. These results, in consequence, confirm sociological rational choice models (e.g. Breen & Goldthorpe, 1997; Becker, 2003; Becker & Hecken, 2009) by showing that not only individual but also socioeconomic factors significantly affect the individuals' educational choice. However, the association between different expected values of future job and choice of higher education is not found due to its statistical insignificance in the logistic models. Nevertheless, it is shown in the descriptive statistics that expected monetary returns appear not to be primary objective of the individuals' future occupation.

Although it is far from straightforward, it is assumed that the effect of status maintenance across the generations is likely to be shown in the models. The estimations of father's education level show that

a father with a degree of higher education is more likely to have a child going to junior college or university. In this respect, it can be interpreted that educated parents intend to avoid downward social status by influencing children's educational decision-making, which is in line with the relative risk aversive behavior mechanism suggested by Breen & Goldthorpe (1997). Following the line of reasoning behind the parental effect, the models also show that the family's expected educational level of child is also very influential determinant on the choice of higher education. It may reflect the motivation of family or parents to move up the social ladder by a means of education.

The most intriguing result in the models is the economic background. According to the estimation, there is no difference of probabilities of higher education by economic status with the odds ratio 1 and significance level of less than 0.001. This result explicitly shows that the choice of higher education would be more affected by individual's scholastic ability and family's educational and social background rather than economic status in South Korea. It is assumed that opportunities for education have been provided extensively in South Korean society so that the individuals have exposed to a better environment where they can make decision on a pursuit of higher education irrespective of economic condition. It might be the rationale behind the unprecedented proliferation of higher education across society. A lower economic status does not discourage students to pursue higher education in as much as they have scholastic ability to enter either colleges or universities. Nevertheless, it is of crucial relevance to pose a question of how economic background does not differentiate the individuals' choice of higher education for a further investigation.

What is assumed up to this point is that there might be other factors associated with educational choice. By this account, it seems applicable in discussing the mass-scale expansion of higher education from a different perspective. One plausible factor is welfare stigmatization. More specifically, societal stigmatization of people with lower levels of education may influence the educational decision-making. This would be particularly a case of younger generations. Magnitude of stigma may allow individuals to avoid being less educated compared to others. Hence, stigmatization per se may function to incentivize the individuals to pursue further education. Yet, there has been no study of stigmatization of less educated people in the fields of economics and sociology of education. Therefore, a further study on social stigmatization with reference to educational level would elucidate the peculiar phenomenon in South Korea.

In the subsequent empirical analysis, it is found that monetary returns (monthly earnings) and non-monetary returns to education (job satisfaction) are positively correlated with the level of education. With respect to earnings, the results of cohort comparison show that earnings are likely to grow over time, presumably owing to the inflations in the South Korean economy. As for job satisfaction, individuals with higher levels of education tend to have higher levels of job satisfaction. In this vein, future educational decision-makers would reckon that their expected monetary and non-monetary returns to education will be higher with the level of education.

Despite the positive correlations between the education level and the monetary and non-monetary returns in general, the extent to which education affects the returns to education is likely to differ by gender. Even with the same level of education, earnings differential between male and female has been still substantial. Females' monetary returns to education tends to be lower than the males' monetary returns at almost all levels of education. Furthermore, unemployment shares of female are much more than those of males on all the education levels. By the same token, it is assumed that the rates of monetary returns to education of female seem to be lower than those of male on condition that both genders are subject to the same average amount of education costs. These results are consistent with literature showing a greater concern regarding gender inequality of educational effect in South Korean society. Nonetheless, it is shown that as the level of education goes up, there tend to be less earnings differential between gender.

In contemplation of the research questions throughout the paper, I have been in search of the answers to those on basis of the empirical analyses. According to the results of analyses, it is concluded that individual and socioeconomic factors are crucial determinants on the choice of higher education, among others, parental effects and economic status are key explanatory factors to elaborate the phenomenon of higher education expansion in South Korea. Despite the insignificant coefficients of the expected value of education, it is acknowledged that the individuals who chose to pursue higher education have gained higher monetary and non-monetary benefits than those who did not continue further education after high school. By this account, a future educational decision-maker would intrinsically reckon the expected value of education in consideration of not only monetary but also non-monetary benefits.

As a final remark, the individuals indeed make educational choices in contemplation of the expected value subject to their budget constraint. On the grounds of the rationality framework, the behavior of educational choice is rational since a higher level of education has eventually result in bigger net benefits. In South Korean context, particularly, budget constraint for the choice of education seems to be referred to the academic ability and parental effect rather than the economic background. Notwithstanding, South Korea has been experiencing the rapid demographic changes owing to the extremely low birth rates over time. In effect, there has been closing institutions due to a lack of students. Moreover, soaring costs of public and private educations have been always problematic and burdensome in society. Substantial investment in education is rather likely to bring vicious financial status for students and their families not only during the study but also after graduation. In addition, growing shares of insecure employment and unemployment rates of the higher education graduates have drawn much concerns. It is likely that the credential effect of higher education becomes weaker over time. By all accounts, ineffective allocation of resources by enormous investment in education may result in negative externalities in society. Thereby, it is inevitable to devise the efficient education system and the effective policies so that society enables individuals to make the optimal choices in terms of education by allowing to allocate resources more efficiently.

This study has been limited to account for the individuals' behavior of choice of higher education and furthermore the expansion of higher education in the South Korean context. It is partly because of limited availability and choice of variables among many other important factors. Furthermore, all the theories and models described in the theoretical framework could not be examined thoroughly in the empirical analyses. Nonetheless, it is anticipated that this study opens the gate to further elaborate the individuals' rational behavior of educational decision-making along with the expansion of higher education.

References

Anchor, J. R., Fišerová, J., Maršíková, K., & Urbánek, V. (2011). Student expectations of the financial returns to higher education in the Czech Republic and England: Evidence from business schools. *Economics of Education Review*, *30*(4), 673-681.

Becker, G. S. (1975). Front matter, human capital: a theoretical and empirical analysis, with special reference to education. In *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education, Second Edition* (pp. 22-0). NBER.

Becker, R. (2003). Educational expansion and persistent inequalities of education: Utilizing subjective expected utility theory to explain increasing participation rates in upper secondary school in the Federal Republic of Germany. *European sociological review*, *19*(1), 1-24.

Becker, R., & Hecken, A. E. (2009). Higher education or vocational training? An empirical test of the rational action model of educational choices suggested by Breen and Goldthorpe and Esser. *Acta Sociologica*, *52*(1), 25-45.

Berg, I. (1970). Education for Jobs; The Great Training Robbery.

Brodaty, T., Gary-Bobo, R. J., & Prieto, A. (2006). Risk Aversion and Human Capital Investment: A Structural Econometric Model.

Brodaty, T., Gary-Bobo, R. J., & Prieto, A. (2014). Do risk aversion and wages explain educational choices?. *Journal of Public Economics*, *117*, 125-148.

Breen, R., & Goldthorpe, J. H. (1997). Explaining educational differentials: Towards a formal rational action theory. *Rationality and society*, *9*(3), 275-305.

Breen, R., van de Werfhorst, H. G., & Jæger, M. M. (2014). Deciding under doubt: a theory of risk aversion, time discounting preferences, and educational decision-making. *European Sociological Review*, *30*(2), 258-270.

Cho, Y. (2016). Higher Education and Social Mobility in Korea: University-Based Meritocracy and Duality of Higher Education Effect.

Choi, K. S. (1996). The impact of shifts in supply of college graduates: repercussion of educational reform in Korea. *Economics of Education Review*, *15*(1), 1-9.

Clotfelter, C. T., & Rothschild, M. (Eds.). (1993). *Studies of Supply and Demand in Higher Education. National Bureau of Economic Research Project Report*. University of Chicago Press.

Collins, R. (1979). *The credential society: An historical sociology of education and stratification*. Academic Pr.

de Dios Jiménez, J., & Salas-Velasco, M. (2000). Modeling educational choices. A binomial logit model applied to the demand for higher education. *Higher Education*, *40*(3), 293-311.

DesJardins, S.L., and Toutkoushian, R.K. (2005). Are students really rational? The development of rational thought and its application to student choice**.** In J.C. Smart (ed.), *Higher Education: Handbook of Theory and Research* (Vol. 20, pp. 191–240). Dordrecht, The Netherlands: Kluwer Academic Publishers.

Esser, H. (1999). Soziologie: Spezielle Grundlagen, vol. 1, Situationslogik und Handeln. *Frankfurt: Campus*.

Freeman, R. (1976). The overeducated american.

Gerber, T. P., & Cheung, S. Y. (2008). Horizontal stratification in postsecondary education: forms, explanations, and implications. *Annu. Rev. Sociol*, *34*, 299-318.

Jones, R. S., & Urasawa, S. (2014). Reducing income inequality and poverty and promoting social mobility in Korea.

Jung, J., & Lee, S. J. (2016). Influence of university prestige on graduate wage and job satisfaction: the case of South Korea. *Journal of Higher Education Policy and Management*, *38*(3), 297-315.

Jæger, M. M. (2007). Economic and social returns to educational choices: Extending the utility function. *Rationality and Society*, *19*(4), 451-483.

Kim, S., & Lee, J. H. (2006). Changing facets of Korean higher education: Market competition and the role of the state. *Higher education*, *52*(3), 557-587.

Kim, B., & Park, N. (2017). Lessons learned from financing universal higher education in Korea. *International Journal of Educational Development*.

Kreidl, M., Ganzeboom, H. B., & Treiman, D. J. (2004). 1 TRENDS IN OCCUPATIONAL RETURNS TO EDUCATION: A COMPARATIVE PERSPECTIVE.

Lee, H., Lee, J. W., & Song, E. (2016). Effects of Educational Mistmatch on Wages in the Korean Labor Market. *Asian Economic Journal*, *30*(4), 375-400.

Manski, C. F. (1993). Adolescent econometricians: How do youth infer the returns to schooling?. In *Studies of supply and demand in higher education* (pp. 43-60). University of Chicago Press.

Menon, M. E. (1997). Perceived rates of return to higher education in Cyprus. *Economics of Education Review*, *16*(4), 425-430.

Meyer, J. W., Ramirez, F. O., Frank, D. J., & Schofer, E. (2007). Higher education as an institution. *Sociology of higher education: Contributions and their contexts*, *187*.

Monaghan, P. (2003). Taking on 'rational man.'. *The Chronicle of Higher Education*, *49*(20), A12-24.

Müller, W., & Shavit, Y. (1998). The institutional embeddedness of the stratification process: A comparative study of qualifications and occupations in thirteen countries.

Nam, Y. S. (1996). Schooling and changes in earnings differentials by gender in South Korea, 1976–1991. *Economics of Education Review*, *15*(3), 245-258.

Ortiz, L. (2010). Not the right job, but a secure one: over-education and temporary employment in France, Italy and Spain. *Work, employment and society*, *24*(1), 47-64.

Paulsen, M. B., & Smart, J. C. (Eds.). (2001). *The finance of higher education: Theory, research, policy, and practice*. Algora Publishing.

Perna, L. W. (2006). Studying college access and choice: A proposed conceptual model. In *HIGHER EDUCATION:* (pp. 99-157). Springer Netherlands.

Psacharopoulos, G. (1985). Returns to education: a further international update and implications. *Journal of Human resources*, 583-604.

Psacharopoulos, G. (1995). *The profitability of investment in education: concepts and methods*. Washington, DC: World Bank.

Psacharopoulos, G., & Patrinos*, H. A. (2004). Returns to investment in education: a further update. *Education economics*, *12*(2), 111-134.

Rabin, M. (1998). Psychology and economics. *Journal of economic literature*, *36*(1), 11-46.

Ryoo, J. K., Nam, Y. S., & Carnoy, M. (1993). Changing rates of return to education over time: A Korean case study. *Economics of Education Review*, *12*(1), 71-80.

Sandefur, G. D., & Park, H. (2007). Educational expansion and changes in occupational returns to education in Korea. *Research in Social Stratification and Mobility*, *25*(4), 306-322.

Schofer, E., Hironaka, A., Frank, D. J., & Longhofer, W. (2012). Sociological institutionalism and world society. *The Wiley-Blackwell companion to political sociology*, 57-68.

Solga, H. (2002). 'Stigmatization by negative selection': explaining less-educated people's decreasing employment opportunities. *European sociological review*, *18*(2), 159-178.

Stocké, V. (2007). Explaining educational decision and effects of families' social class position: An empirical test of the Breen–Goldthorpe model of educational attainment. *European Sociological Review*, *23*(4), 505-519.

Treiman, D. J. (1970). Industrialization and social stratification. *Sociological inquiry*, *40*(2), 207-234.

Vaizey, J. (1972). *The political economy of education*. London: Duckworth.

Online sources

Governmental Academic Information Center, www.academyinfor.go.kr

Korea Research Institute for Vocational Education & Training, www.krivet.re.kr/eng/eu/index.jsp

Ministry of Education, Republic of Korea, www.moe.go.kr

OECD (2018), Population with tertiary education (indicator). doi: 10.1787/0b8f90e9-en (Accessed on 12 May 2018)

OECD (2018), Employment by education level (indicator). doi: 10.1787/26f676c7-en (Accessed on 15 March 2018)

OECD (2018), Youth unemployment rate (indicator). doi: 10.1787/c3634df7-en (Accessed on 12 May 2018)

OECD (2018), Spending on tertiary education (indicator). doi: 10.1787/a3523185-en (Accessed on 05 May 2018)

Appendix I. Description of data and selection of variables

Cohorts	Time (year)	Dataset information (observations/variables)	Information level
H_cohort: High school 3rd year students (2004)	Past (2004)	Wave 1 students (2000(general)+2000(vocational) /364(general)+367(vocational))	Individual - Gender - Type of high school - Perceived academic ability - Expected value on job
	Past (2004)	Wave 1 households (3880 /394)	Socioeconomic - Father's education level - Father's employment status - Household income - Family' expected education level of child
	Present (2012)	Wave 9 individuals (2514/1362)	Individual socioeconomic - Choice of Higher education - Current educational level - Employment status - Earnings - Job satisfaction
C_male : College male graduates in 2007	Present (2015)	Wave 12 individuals (719/1362)	Individual socioeconomic - Current educational level - Employment status - Earnings - Job satisfaction
M_cohort: Middle school 3rd year students (2004)	Present (2015)	Wave 12 individuals (2496 /1413)	Individual socioeconomic - Current educational level - Employment status - Earnings - Job satisfaction

Appendix II. Table of logistic models

LOGIT models	Model1				Model2				Modle3			
Independent variables	Estimate	OR	2.5%	97.5%	Estimate	OR	2..5%	97.5%	Estimate	OR	2.5%	97.5%
Ref: (GENDER) Male												
(GENDER) Female	-0.14	0.87	0.65	1.15	-0.15	0.86	0.65	1.15				
Ref: Vocational high school												
(STYPE) General high school	1.59 ***	4.88	3.38	7.19	1.58***	4.88	3.38	7.17	1.57***	4.83	3.36	7.08
Ref: (ABILITY) Moderate												
(ABILITY) Very poor	-0.99***	0.37	0.22	0.64	-1.00***	0.37	0.22	0.63	-1.00***	0.37	0.22	0.63
(ABILITY) Not good	-0.12	0.88	0.64	1.23	-0.13	0.88	0.64	1.22	-0.13	0.88	0.64	1.21
(ABILITY) Good	-0.08	0.92	0.58	1.51	-0.08	0.92	0.58	1.51	-0.08	0.92	0.58	1.50
(ABILITY) Very good	13.81	10e+05	0.00		13.84	1.0e+06	2.3e-07		13.91	1.1e+06	1.5e-07	
HHIC	0.0***	1.00	1.00	1.00	0.0***	1.00	1.00	1.00	0.00***	1.00	1.00	1.00
Ref: (FAEDUL) High school graduate												
(FAEDUL) Below high school	-0.15	0.86	0.63	1.16	-0.15	0.86	0.64	1.17	-0.14	0.87	0.65	1.17
(FAEDUL) 2-4 year college/University graduate	1.00**	2.72	1.43	5.75	0.98**	2.67	1.41	5.62	0.98**	2.66	1.41	5.59
(FAEDUL) Graduate school graduate or beyond	0.85	2.35	0.48	42.41	0.83	2.29	0.47	41.35	0.93	2.53	0.52	45.71
Ref: (FAMEX) 4-year University												
(FAMEX) High school	-1.93***	0.15	0.07	0.29	-1.94***	0.14	0.07	0.28	-1.92***	0.15	0.07	0.28
(FAMEX) 2-year Junior College	-0.59***	0.55	0.40	0.76	-0.59***	0.55	0.41	0.76	-0.61***	0.54	0.40	0.74
(FAMEX) Master's degree	1.54*	4.64	1.39	28.88	1.53*	4.61	1.39	28.65	1.52*	4.59	1.39	28.48
(FAMEX) Doctoral degree	0.06	1.06	0.59	2.07	0.06	1.06	0.59	2.07	0.07	1.07	0.59	2.08
Ref: (FAWS) Employed permanently or over 1 year												
(FAWS) Unemployed	-0.15	0.86	0.49	1.54								
(FAWS) Family worker without salary	-0.52	0.59	0.06	13.24								
(FAWS) Employed with less than 1 year contract	0.04	1.04	0.66	1.68								
(FAWS) Entrepreneur with employees	-0.06	0.94	0.56	1.63								
(FAWS) Self-employed without employees	0.00	1.00	0.70	1.42								
Ref: (EVJ) Future job is unknown yet												

(EVJ) The job to serve society	2.11.	8.27	1.40	160.22	2.10	8.20	1.39	159.33				
(EVJ) The job which enables to develop and be creative and autonomous	0.34	1.40	0.83	2.44	0.34	1.40	0.83	2.45				
(EVJ) The job which gives relaxing time and pleasant environment	1.21	3.34	0.91	21.75	1.20	3.33	0.91	21.65				
(EVJ) The job which gives societal reputation	0.48	1.61	0.57	5.80	0.48	1.62	0.57	5.84				
(EVJ) The job which meets my talent and aptitude	0.19	1.20	0.87	1.66	0.18	1.20	0.87	1.66				
(EVJ) The job which secures sustainable employment status	0.05	1.05	0.62	1.85	0.05	1.05	0.61	1.85				
(EVJ) The job which yields higher earnings	-0.01	0.99	0.49	2.14	-0.03	0.97	0.49	2.09				
(Intercept)	0.63*	1.89	1.08	3.30	0.60*	1.83	1.13	2.96	0.68**	1.98	1.29	3.05
AIC	1359.1				1349.70				1344.8			
Pseudo-R^2 (McFadden)	0.25				0.25				0.24			
Loglikelihood	-652.57				-652.87				-658.40			
Likelihood ratio statistic	<0.001 ***				0.99				0.20			

p<0.05 *, p<0.01 **, p<0.001 ***